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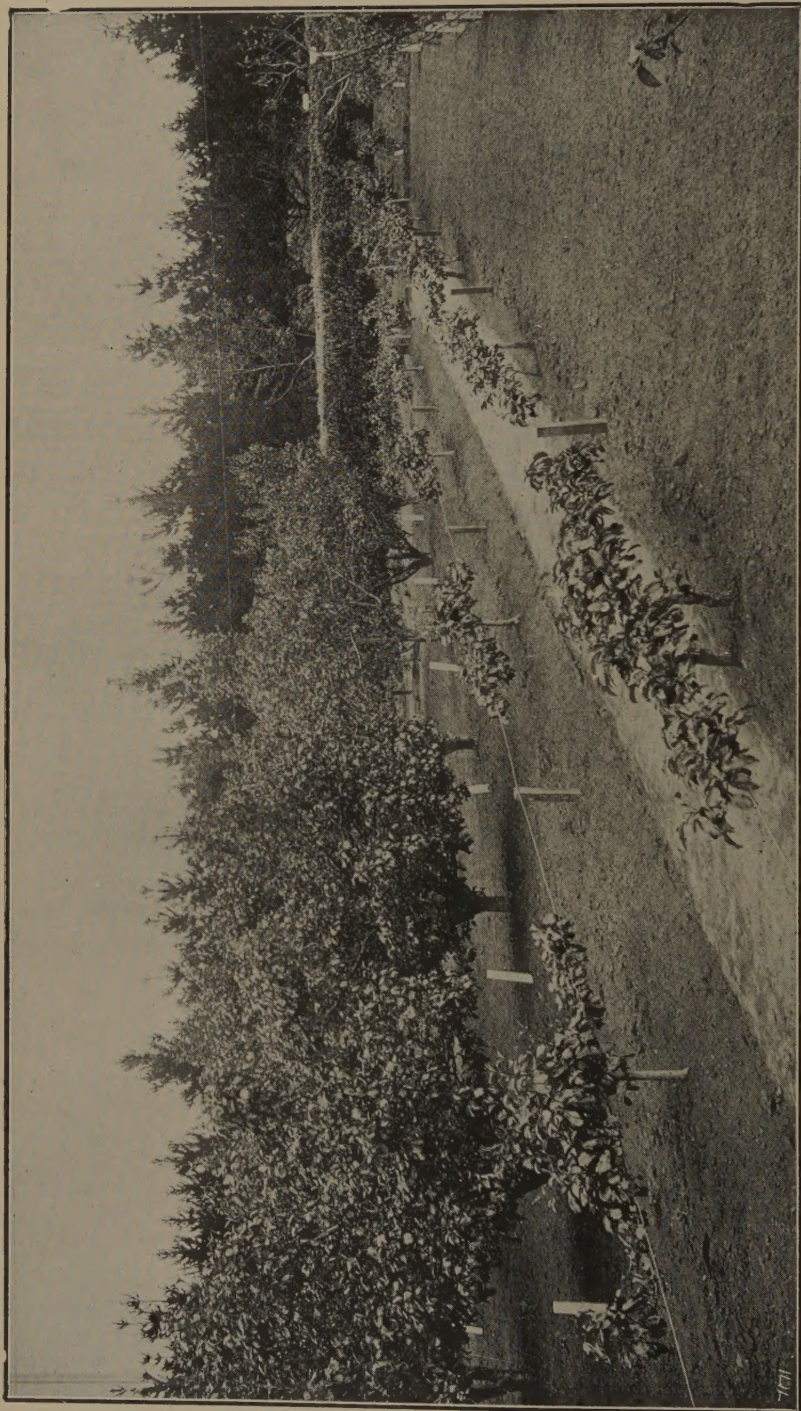
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The Orchard, Moutmahaki Experimental Farm.]



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AGRICULTURAL RESEARCH.

*A Review of the Investigation by Mr. T. Jamieson on the Utilization of the
Nitrogen of the Air by Plants.*

E. CLIFTON.

IT is seldom recognized that agricultural research has been widely undertaken in Great Britain. It is known that research work has been carried out at the experimental farms at Rothamstead and at Woburn, also that in later years similar work has been undertaken at Cambridge University. It is known, too, that the British Government provides a liberal grant to encourage such labour, but this is quite recently. While this is going on, how few know that in Scotland the Aberdeenshire Agricultural Association, later designated the Agricultural Research Association, has since 1875 quietly and effectually carried on original investigation. Through the courtesy of Messrs. Montgomery and Co., of Christchurch, reports of that association have been available.

The objects of the Agricultural Research Association are,—

- (1.) To obtain reliable and useful information on agricultural subjects by means of scientific investigation and practical experiments, and to disseminate the information :

(2.) To advance and aid in such a way as may be expedient the knowledge and the application of agricultural science.

The Director of Research is Mr. Thomas Jamieson. This gentleman has made a life study of the problems of plant-nutrition, and of these "The Utilization of the Nitrogen in the Air" is the investigation described in these reports.

Mr. Jamieson sets out the general belief on the utilization of the nitrogen of the air by plants. He writes,—

"It is held that plants, with the exception of legumes, cannot utilize the nitrogen of the air, the explanation in the case of legumes being that by the aid of micro-organisms on their roots these plants utilize atmospheric nitrogen."

With this premise Mr. Jamieson proceeds to show—(1) That the legume-tubercle theory is untenable; (2) that the nitrogen of the air is directly used; (3) that the application of this knowledge is valuable to the agriculturist.

The investigator proceeds:—

"There came a special inquiry into the family of the legume. On the roots of these plants there are found small growths, round, oval, and divided. They were called 'galls' by Malpighi, 'morbid tumours' by de Candolle, 'imperfect roots' or 'a form of roots' by de Vries and others. No special action was ascribed to them. Among the first to claim for these tubercles the fixation indirectly of nitrogen from the air was Hellriegel, who in 1879 claimed that legumes can fix, or at least in some way acquire, free nitrogen, that the small tubercles found on the roots had direct connection with this fixation, and that the action is due to micro-organisms.

"The recognized ability of Hellriegel gave weight to his statement. It had the good effect of instituting investigation. Most of these investigators appear to have misdirected their efforts to what now appears to be an erroneous preconception of bacterial influence. It was the period when the almost universal action of bacteria was being first recognized: there was a tendency to ascribe almost every mysterious action to bacteria.

"Along with the bacterial action went the idea that what was called a 'symbiotic' action took place—that is, a 'mutual help' action—the legumes helping the bacteria by providing their food, the bacteria helping the legume by transforming the free nitrogen of the air into a form that the legumes could utilize. This has been accepted. It has held a more or less disputed position for the past twenty-five years."

The evidence in support of these views seemed insufficient.

Mr. Jamieson proceeds to adduce reasons to question these conclusions:—

"I had completed an investigation into the club-root of turnips (*Plasmodiophora brassicae*), a disease of fungus origin. I suspected that the legume-tubercle had probably a similar origin.

"So fixed had the bacterial idea become that in Germany an industry was actually started to trade in legume-bacteria to inoculate the soil. It was offered under the name of Nitragin. It failed; other preparations were offered; disappointment again followed. The 'bacterial' and

'symbiotic' doctrine occupies the field. It is even taught as an ascertained fact.

" Gradually more light was shed. Viullemain in France and Franck in Germany found complete fungus, described it in detail, and named it."

The presence of a complete fungus provides, it is claimed, the explanation of the tubercle formation. This explanation goes to depreciate the doctrine of bacterial action: it does not approach the question of fixation of nitrogen by plants generally.

Franck considers that " Hellriegel's trials are far from proving that the tubercles fix nitrogen." He has proved that vigorous plants of legumes may be grown in sterilized soil without tubercles. As to roots absorbing nitrogen from the air, he proves by elaborate trials that there is no indication of this nature in roots. He finds that " Algæ certainly absorb and fix nitrogen, that certain other plants acquire nitrogen feebly, but that legumes acquire this element to a conspicuous degree." As to the manner of the absorption, Mr. Jamieson admits that the action, and the seat of the action, are at that time unknown. He conjectures that some special organ would be found in plants for the absorption and fixation of nitrogen. In support of his conclusions, among other results, he gives,—

" Pots filled with sand were exposed under glass for six months and were watered with distilled water. Algæ were seen to grow abundantly.

" At commencement the sand contained nitrogen .3383 grams.

" At the end of trial the sand contained nitrogen .4238 ,,

" Gain .. .0855 ,,

" Lupins were grown in sterilized sand. There were no tubercles on the roots of the plants. They exhibited a gain in nitrogen equal to 288 per cent. over the original nitrogen."

The position is apparently shown by Franck:—

" The fixation of free nitrogen by algæ has been demonstrated, and the fixation by legumes is conspicuously proved. Further,—

" (1.) The formation of tubercles by bacterial action is unsupported. It is similar to the ordinary effect of fungi, and a fungus has actually been found.

" (2.) It is a normal growth containing a natural store of plant-food through the union of a fungus and a legume—an example of symbiosis.

" (3.) Algæ absorb and fix free nitrogen directly. Legumes acquire it, but the means are to be investigated."

With the first and third Mr. Jamieson agrees. With respect to the second he disagrees, as—

" I regard the tubercles as abnormal growths. I hold that no symbiotic action takes place: that the fungus is not the fixer of the nitrogen; that the legume plant is itself the fixer, and that it sends its manufactured albuminous product to heal up the wound or to counteract the drain of the parasitic fungus, and that the tubercles have nothing to do with the fixation of the nitrogen of the air."

Further evidence that free nitrogen is not gathered by the direct action of the nodules or tubercles on the roots of legumes is,—

“How is it that these tubercles are relatively rich in nitrogen, as shown by the following: In 100 parts of the dry substance of lupin there are,—

				In Roots.	Tubercles.	Seed.
Nitrogen	..	..	..	1.13	7.25	6.80

The reason is: the plant being attacked by the fungus a wound is made, the fluid of the plant courses to repair it, and not only is the leguminous fluid of the plant rich in nitrogen, but its most nitrogenous fluid—albumen—is just the plastic material (like the white of an egg) specially suited to heal the wound and to form a sac round the invader.”

From this it would appear that the excitation to repair injury induces the legume to exertion to absorb a greater proportion of the desired element nitrogen. It will be shown that the legume is strongly provided with organs adapted to this purpose.

The infection of the soil, or, to use a later term. “soil-inoculation,” is provided “by the dissemination of the fungus, and cereal crops are increased by following legumes by the decay of the tubercles and their contents, and their subsequent transformation into compound forms of plant-foods.”

There are tubercles on other plants than legumes. Good examples are the immense groups of tubercles commonly found on the roots of *Eleagnus japonica* and the common alder. The grape-vine attacked by *Phylloxera vastatrix* and the crown-gall of the apple are evidence of exaggerated growths, and the appearance of turnips affected with club-root is well known.

“There is nothing exceptional in the bearing of tubercles by the legume. The nodules or tubercles are well displayed. The legume is a plant specially sought by a fungus demanding nitrogen. It is provided with the means of supplying the element, hence it is specially attacked.”

The summary that the tubercles do not fix nitrogen is,—

“Vigorous legumes can be grown without exhibiting tubercles. Legumes acquire nitrogen without tubercles. Hence the tubercles do not fix it. We are thus led towards the further idea that the fixation of nitrogen is effected by the plant itself, and now seek for that evidence.”

For the proof of the direct fixation of the nitrogen from the atmosphere Mr. Jamieson quite realizes the serious responsibility of postulating a new doctrine. He presents the result of thirty years’ investigation. He submits that plants generally absorb free nitrogen directly from the atmosphere, and transform it into albumen; that the quantity so absorbed and fixed varies in proportion to their special structures that perform this function. He asks,—

“How comes it that over the vast extent of the earth lands have continued to produce vegetation, from grass-plants to forest-trees, for ages without exhaustion of the soil, if they cannot provide themselves with

nitrogen? Is there another source but the air? The problems are: Do plants generally fix atmospheric nitrogen? If so, by what part of the plant and by what means is the nitrogen fixed? The answer appears obvious.

"Plants are divisible into four main parts—the flower, the stem, the roots, and the leaves. The absorption and fixation take place before the flower is formed. It cannot be in the stem—this is often woody and impervious. It cannot be reasonably supposed to be in the root, for nature practically excludes that part from the air, buries it in the soil, and often in water, where it is even more excluded from the air. My attention was directed to the leaves."

Being of opinion that plants generally fix nitrogen, the investigator proceeds,—

"I will demonstrate that this function is in accordance with nature:—

"Fungi: These lowly plants may be regarded as unable to fix nitrogen. They do not contain chlorophyll, which enables green plants to decompose carbonic anhydride. The same cause may prevent the fixation of nitrogen, and such colourless plants are parasitic.

"Bacteria: These are also colourless. They may be unable to fix nitrogen, but in view of their varying character—aerobic and anaerobic—they may have such power in regard to nitrogen. Bacteria prepare nitrogen for plant use: they may not obtain nitrogen.

"Algæ: These possess the green colouring matter chlorophyll. Their power to fix nitrogen is proved by Franck and others.

"Higher plants: The outer layer of their leaves are aggregations of green cells spread out to the air and separated only by a skin of varying thickness. There seems no reason to go further. Nature appears to provide special means for all plants to absorb nitrogen. Even the hardest leaves are soft in the earlier stage. In this state, and in the yearly addition, there are conditions for the absorption of the supply of nitrogen for their requirements in their natural or wild state, although this may be insufficient for the larger production demanded in cultivation.

"Legumes: The cultivated members of this family have broad soft leaves studded with apertures—'stomata'—supposed to serve for exhalation: it is accepted that the green cells, or the chlorophyll contained by these cells, decompose the carbonic-acid gas. Cannot a similar action extend to nitrogen?"

The turnip, one of the most important of our plants, is closely considered by Mr. Jamieson. He says,—

"The turnip stores 90 per cent. of water in its bulb. The leaf transpires what the plant chiefly requires—water. The leaf is not confined to one action: it includes the decomposition of carbonic acid. That is a dual action. May it not have a third? Experience and experiment show that the turnip does not in practice require artificial nitrogen. The explanation is: This plant is able to fix the necessary quantity of this element from the air. No doubt if the soil is very deficient in nitrogen the crop will be poor if no artificial aid in nitrogen is given, because there is insufficient of this element in the seed, and the few small leaves can provide little at first. This may suffice for the plant in its wild state, but is not enough for the more rapid and larger growth demanded by cultivation.

"Contrasting with these plants cereals and grasses that demand artificial supplies of nitrogen, instead of the broad leaves of those requiring but

little aid from this artificial supply, we find narrow, hard, fibrous leaves. It is only in the earliest stage that the leaf is soft. It is then only that nitrogen may be gathered. The artificial aid is required for crop-production."

This is, so far, indirect evidence. The positive is shown:—

"Among others, the following plants were analysed, and found to contain the following proportion of nitrogen:—

NITROGEN IN DRIED PLANTS.				Per Cent.
1.	<i>Spergula arvensis</i> (yarr)	..	..	4.40
	<i>Stellaria media</i> (chickweed)	..	..	2.95
	<i>Urtica divica</i> (nettle)	..	..	3.02
	<i>Sinapis arvensis</i> (charlock)	..	..	2.57
2.	Rape	..	..	2.88
	Red clover	..	..	2.61
	Turnip	..	..	2.25
	Wheat	..	..	1.11
	Oat	..	..	1.10
	Barley	..	..	0.88

It is seen,—

"(1.) That the plants (weeds) in group 1 contain more nitrogen than any of the plants usually cultivated.

"(2.) That in cultivated plants those that contain most nitrogen are those that require but little or no artificial supply of that element (legumes and crucifers), and those that demand artificial aid (grasses and cereals) are those that contain the least nitrogen."

It is pointed out that the information provided by the plants of the first group supplied the very indication that was required: the examination of the plant containing the greatest quantity of nitrogen presented direct evidence and exhibited the organs highly adapted to the fixation of nitrogen. The particular organs on the leaves of the *Spergula arvensis* (yarr or spurrey) are hairs studded over the leaf. Mr. Jamieson continues,—

"The leaves of this wild plant are narrow, long, and soft. An examination with the microscope revealed a remarkable structure of hairs. These hairs on the leaf and structure of *Spergula* are each divided into sections. The upper section, and it alone, is the usual colour of chlorophyll. So specialized and so sharply defined are these hairs that it is evident a definite function is attached to them.

"It was found that in these parts of the plants the upper section of the hair is exceptional in the possession of a large quantity of albumen, the nitrogenous element in the plant. The presence of albumen in these hairs was confirmed by three tests—(i) iodine, (ii) cupric sulphate and potash, (iii) mercurous nitrate and heat."

It is again affirmed,—

"Neither [bacteria nor fungi] enter into the process. It is a natural process in the leaves, as is the fixation of carbon from the carbonic anhydride of the air."

In the careful and patient examination of the leaves of many plants remarkable modifications of these nitrogen-fixing organs were observed and described.

"Plants of widely different families were examined, and in all instances there has been found a special structure clearly performing the function of absorbing nitrogen and transforming it into albumen."

A short description of the investigation with *Spergula arvensis* as the medium will be interesting as presenting the methods applied over the wide range of plants:—

"I had long ago collected and preserved specimens of *Spergula* as a botanist, but no importance was attached to the glutinous hairs on the leaves, except in cases where such hairs are distinctive, as the stinging hairs of the nettle or the digestive hairs of the *Drosera* (sundew) and others. The belief was that the hair contained matter secreted by the plant. It was not recognized that it was a gland exposed to the air in a special manner for a special purpose. Here is a cell containing chlorophyll matter held up in the air. For what purpose? May it not be the nitrogen absorber and fixer? The various tests for the recognition of albumen were applied. Its presence was certified in the tips of these hairs. The course of the albumen was traced. The hair is divided into sections. By the side of each there is a passage so narrow that only liquid can pass through. At the end of the hair these divide into smaller channels, and by these the albuminous liquid is carried into the recesses of the leaf, finally surrounding the cells of the plant and supplying their requirements. The direct absorption and direct fixation is clearly demonstrated."

The seeking for the organs of nitrogen-absorption revealed the most varied forms, as in the bean (*Vicia faba*):—

"No hairs were found on mature leaves. It might have been assumed that fixation took place over the whole leaf. It is fleshy, soft, and smooth. Finally a slight round projection was found on the edge of the mature leaf. This on examination proved a sectional hair almost imbedded in the tissue. On young leaves the specialized hairs are profusely exhibited."

The turnip and rape are plants always attracting the farmer's interest. The turnip is shown to be specially supplied with means of obtaining nitrogen, and in this we can see the harmony of practice with the solution of the fixation of nitrogen. The turnip does not need an artificial aid: it has directly absorbed sufficient nitrogen from the air.

Rape: This plant has a structure practically identical with the turnip, and appears to have an additional activity, possibly assisted with its viscous skin. The special examination of the turnip and rape was brought about from the fact that a better crop of oats was secured after ploughing rape than resulted from oats after clover.

It is shown that cereals, including grasses, are but poorly provided with organs of nitrogen-absorption. These plants therefore demand an artificial aid.

The investigation demonstrates that plants absorb and fix nitrogen, but with the process the investigation does not pretend to deal. No

more is known of this than of the process of leaf-decomposition of carbonic acid into carbon compounds in a form available to the plant.

The presentation of this doctrine, that plants directly absorb free nitrogen from the air, conflicts with earlier beliefs. The new teaching is, however, obtaining acceptance. This doctrine is acknowledged with appreciation in the publications dealing with agricultural science under the authority of the Minister of Agriculture of France. Professor Franck, of Berlin, Professor Roirdam, and others concur.

This doctrine has also been assumed to be in opposition to the explanation accepted for many years, that of the acquirement of nitrogen by bacteria on root-nodules on legumes. There is undoubtedly the fact that it does seriously militate against the belief that the micro-organisms of the root-nodules are alone concerned in this function.

The Research Association submits that it should be clearly understood that the doctrine advanced does not contradict the possibility of any action by bacteria. The one is independent of the other, and both may exist harmoniously side by side. Here it is only sought to show that the nitrogenous alimentation of plants is sufficiently explained by the doctrine that Mr. Jamieson has so perseveringly demonstrated.

PRACTICAL APPLICATION.

The effect on the soil of producing certain crops, as cereals and grasses, is to reduce the available plant-foods. Of these, in their simple forms, the most important supplied by fertilizers are nitrogen, phosphorus, and potash, and of these the most costly is nitrogen. It is shown by the investigation that the farmer can avoid the expense of the purchase of nitrogenous manures—viz., nitrates, sulphate of ammonia, and the new fertilizers, nitrate of lime and calcium-cyanamide, which are being produced from the air by the medium of electrical appliances—by the adoption of a rotation to include those plants that are rich in nitrogen. This is not new. Legumes have been availed of from the earliest recorded time as preparatory to cereals. What is new is that there is a wider field of plants for selection, and the farmer knows why these plants enrich the soil for the nitrogen-demanding cereal. The plants, among others mentioned by Mr. Jamieson, are rape, mustard, and turnips.

“In Scotland the cereal crops have been found materially improved by ploughing in mustard, and in Denmark it is a successful practice.”

An experiment was made of ten plots. On five rape was ploughed in; on five there was no rape, the plots (rape and no rape) being alternate. The result was most remarkable.

“The proportions are illustrated in a diagram:—

“Average crop on five plots after rape —————
 “Average crop on five plots with no rape ———

"The differences were such as to cause surprise. The plots were originally in an exhausted state. Such differences would not be obtained in practice, but they clearly show that advantage may be secured by ploughing in nitrogen-collecting plants in their leafy stage.

"In this connection the recommendation not to carry the turnip-leaves off the field cannot be too strongly repeated. The benefit to the succeeding crop is well known, though it was not realized that the absorption of nitrogen was by the leaves, and that provision of this element to the succeeding crop is the explanation. The turnip shows in a dried plant per 100 parts 2.25 of nitrogen. The nitrogen in the leaves of a crop of turnips is equal to 1 cwt. of sulphate of ammonia. The bulbs alone of a crop of 25 tons would represent fully 5 cwt. of that fertilizer (sulphate of ammonia)."

The result of a further trial of turnips carefully set out to estimate the gain of nitrogen is,—

"Nitrogen in 19.45 tons bulbs at 2.25 per cent. dry ..	98 lb.
,, in leaves, about 58 cwt. at 2.66 per cent. dry ..	17 lb.
,, used by crop	115 lb.
,, applied as manure	17 lb.
,, gained by crop	98 lb.

This gain is equal to 4 cwt. of sulphate of ammonia, and has had no source but the air."

The inference is that the turnip is a large absorber of nitrogen and merits its well-recognized position in rotation.

In *World's Work* of September, 1912, there was published an account of the effect at the experimental farm at Woburn of mustard (a crucifer) on one plot and of tares (a legume) on another. It would be generally supposed that the nitrogen brought by the tares—and analysis proved the plant did bring it—would have benefited the succeeding cereal more than the mustard, but it was found that the crop was heavier after the mustard. The explanation given is that on the light soil of Woburn the mustard did more for the mechanical texture of the soil, and for its water-bearing capacity, than did the tares. It is, at least, not the difference in the nitrogen-content of the plants. In this the legume and the crucifer are about equal. The cause of the difference in result is yet to be defined.

The research of Mr. Jamieson reveals a most patient and persistent investigation. It extended, in fact, to a lifetime. The world of agriculture owes to him its gratitude. It is now for the farmer to apply his teaching to its practical use.

It is difficult to provide a complete review of Mr. Jamieson's investigation within the limits of this contribution. Those who are more particularly interested are referred to the reports of the Agricultural Research Association, Glasterberry Milltimber, Aberdeen, or to the director, Mr. Thomas Jamieson, 10 Belmont Street, Aberdeen.

HELIANTHI.

E. CLIFTON.

THERE are several varieties of this species. The particular variety now in question may be described as resembling a wild artichoke.

The soil, season, fertilizers, and cultivation demanded are similar to those extended to the potato. The rows should be 3 ft. wide, and the tubers in the rows not closer than 18 in. The tubers are ripe when the stalks become withered. As with the ordinary artichoke, the tubers do not remain sound for any long time after having been dug. They are better lifted as required. It is difficult to dig all the tubers; some usually remain in the ground, and these are sufficient for the crop of a second year.

Helianthi tubers provide a food of about the same value as potatoes. The experience at the experimental farms is that stock do not readily consume them. It is noted, too, that this applies to the artichoke, which is also not acceptable to stock.

Those who are interested in this plant advocate that pigs should be enclosed on an area of helianthi and be permitted to root up the tubers as they may desire. At Ruakura, where this was tested, the pigs did not root up or consume any appreciable amount of them. The stalks produce an enormous weight of matter, but stock have no greater relish for this part of the plant than for the tuber.

This represents the present experience at the experimental farms. Further trials are being made, and the results will be published as the information becomes available.

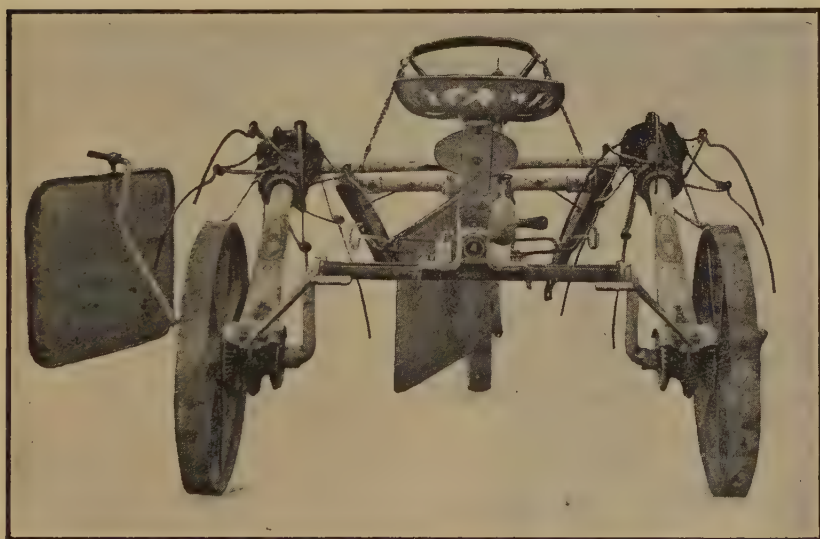
It would appear that helianthi will be discovered to be in the category of plants that are useful only while ardently advertised, just as with some patent medicines, of which, if there were no advertising, there would be no sales. This is the experience with once well-advertised plants, such as prickly comfrey (*Symphytum asperinum*), teosinte (*Euchloena mexicana*), the Wagner flat pea (*Lathyrus sylvestris* var.), sulla (*Hedysarum coronarium*). These were wonder plants. None remain in farm practice.

It must be remembered that the conditions in the countries where these plants are availed of with benefit are probably very different to those of New Zealand. There may be aridity, or the stock may be generally stall-fed. Under the first condition the green stalks would be readily eaten. In stalls stock consume the roots that may

be offered, and most certainly stock would find the stalks palatable. Quite a different condition applies in New Zealand. Stock are grazed in the field for practically the whole year, they are accustomed to the green grass, and do not avail themselves of foods of unusual flavour. The root of helianthi has the earthiness so well known in the artichoke, and the stalk a flavour between acidity and pungency.

There are no indications obtained from our experiences that the extended cultivation of this plant should be undertaken.

BLACKSTONE SWATHE-TURNER.



Photograph taken at Ruakura Farm of Instruction.]

THIS is an excellent haymaking implement. It has the advantage over many other makes in that it turns the swathe with the greatest possible gentleness, thereby reducing the damage caused through loss of leafage to a minimum, and for this reason it is particularly adapted for turning lucerne hay. The action may be adjusted instantly so as to convert the turner into a windrower, throwing four swathes into one.

THE most forceful factor disclosed by the teachings of modern agricultural science is that every farmer should be an experimentalist. He must study for himself his climate and his soil, and breed stock and grow crops best adapted to these if he would succeed.

FLAYING HIDES AND SKINS.

THE CORRECT TREATMENT.

T. J. BUCKTON.

AMONG the many things which farmers, or those who have to slaughter live-stock, should know how to do properly is to flay cattle and skin sheep; this not only in the interests of themselves, but also of those into whose hands the skins must eventually pass. Many fail to realize the increased revenue which a little care means in this connection. It

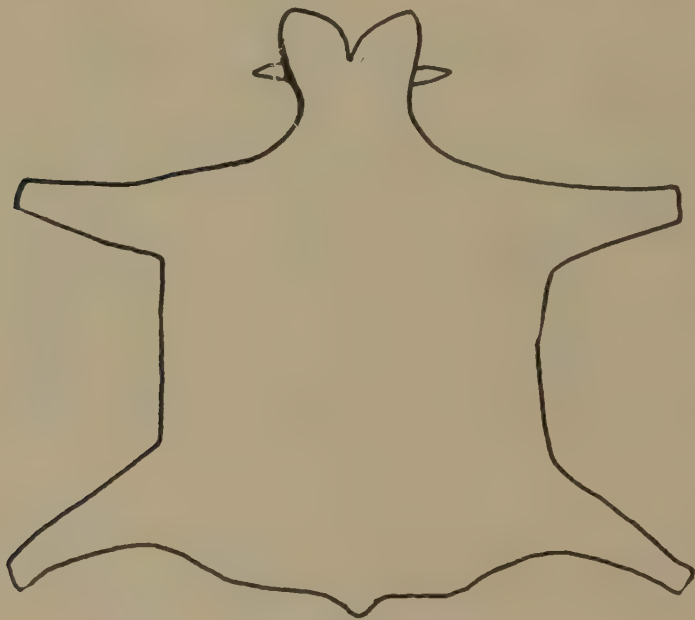


FIG. 1. A PROPERLY FLAYED SHEEP-SKIN.

is only natural that buyers will give a better price for a skin that is clean-woolled and "square cut" than for one the wool of which is saturated with dried blood and filth, with the pelt having irregular cuts and jagged edges, and with unsightly pieces of fat and flesh left adherent to the skin.

The object desired in this article is to put the correct method of treatment before those who are interested, so that they may be enabled

to get better prices for their skins by marketing them in a proper condition.

SHEEP-SKINS.

If a proper slaughtering-place is not available the animal should be taken to a gentle rise, or anywhere where the blood may flow clear of the wool. The throat is then cut, and the neck broken by bending the head back on the shoulders. After the animal is thoroughly bled it should be removed a few feet clear of the blood and placed squarely on its back. Now proceed to remove the skin from both cheeks and head, being careful to remove the ears with the skin and to see that they remain attached thereto: this is necessary to comply with the law. Then start to flay down the fore part and inside of each front leg to a point immediately below the cut in the neck, next carefully pulling the skin clear of the brisket. Hold it with one hand, and



FIG. 2. AN IMPROPERLY FLAYED SKIN.

with the other push the skin from the belly under and up to about the "pouch" or teats. Now make an incision along the neck, exposing the windpipe, pulling the gullet from behind, and making a knot in it. This, of course, is to prevent the liquid contents of the stomach from coming through when the animal is hung up. Next start on the hindquarters, making the first incision from the hock to a point immediately under the tail from down the back and

inside of both legs. Then pull the skin up in the region of the pouch or teats with one hand, and with the other perform a similar operation as on the brisket, thus freeing the skin entirely from the abdomen. Now hang the carcase up and make a straight cut down the loose abdominal skin from pouch to neck, free the skin from the carcase without the use of the knife, except in the region of the tail, working up the flanks to the hind legs and down the flank of the fore legs and shoulder. Then, after skinning round the tail with the knife, take hold of the hind part of the skin with both hands and pull steadily downwards, thus taking the skin clean from the back of the carcase and outwards from the carcase and off at the neck. If this operation has been properly performed a good "square" skin will result, as shown in Fig. 1; if not, the result will probably be as shown in Fig. 2.

Treatment of Sheep-skins.—Carefully pull and straighten out the pelt and hang over a rail or fence out of the sun until properly dry, being careful to keep a lookout for destroying vermin. When dry, pack in bundles or bales and keep in a cool place.

OX-HIDES.

Method of Flaying the Ox.—After having been slaughtered and properly bled, the animal is placed firmly on its back. The head and cheeks are first skinned, then an incision is made the entire length of the carcase, commencing at the throat and then down the centre of the neck, brisket, abdomen, between the thighs, to the tail. The fore and hind legs are next removed from the carcase, the fore legs at the knee, and the hind at the hock. Now, starting from the centre incision in the abdomen, flay the hide down each flank, side, and rump, reaching as far under to the back as possible; free the skin from the hind legs by starting with an incision down the back of the leg and continue across to a point immediately opposite the back of the thigh of the other hind leg, at the same time being careful with the knife on the outside upper part of the leg or thigh. In the case of the fore legs, make an incision down the inside of the elbow about the middle of the leg, continuing in a line across and opposite to the middle of the fore leg. After the carcase is opened and the brisket and pelvic bone sawn through, it is hoisted sufficiently high for the operator to proceed with the flaying. He commences with the tail, then takes a firm grip of the hind-leg skin with both hands (or a blunt hook may be used), and, with quick jerking, pulls down and towards the back, frees the skin from the thigh, then removing it from the centre of the back. The carcase is then hoisted high enough to enable him to remove the skin from the fore part of the fore legs, the neck, and shoulder.

A very large percentage of hides are materially reduced in value on account of their being damaged through too heavy-handed fire-branding; in fact, certain firms have discontinued buying hides damaged by this means. The usual position of the firebrand being on the rump, back, or upper sides of the carcase, it necessarily follows that a too-long or too-heavy application of the iron on these parts results in the fibre necessary to a good leather being burnt through, or nearly so, in the most valuable part of the hide (the butt), as shown in Fig. 3.

Treatment of Hides.—Spread the hide out on an even surface and sprinkle over all parts some coarse curing-salt or crushed rock salt.

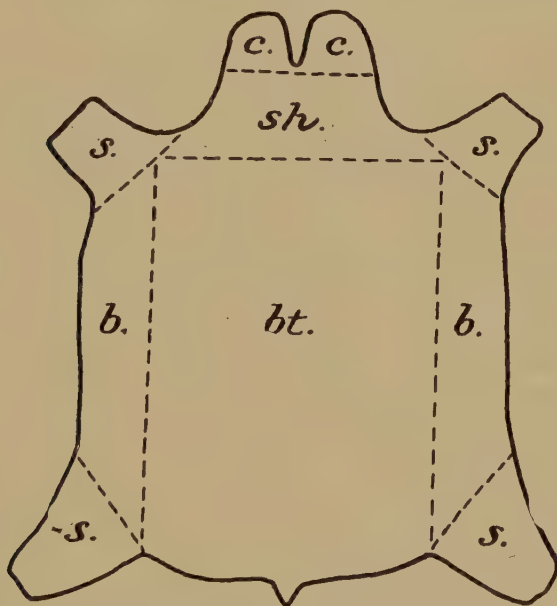


FIG. 3. A PROPERLY FLAYED OX-HIDE.
c.c., cheeks; sh., shoulder; s., shanks; b., belly; bt., butt.

After about forty-eight hours, or perhaps longer if required, sprinkle on more salt, and fold the hide into a neat bundle, hair outwards.

If the above directions are carefully followed and a little time spent on the operation, it will be found that the result will well recompense the farmer for the extra trouble taken.

The total value of corn-offals, oil-cakes, and other feeding-stuffs, and of artificial fertilizers, used in Great Britain in 1907 was £28,400,000. In the same year the total value of artificial manures manufactured was between £5,573,000 and £6,671,000. The feeding-stuffs manufactured in Britain represented a value of £16,321,000.

NEW ZEALAND FLAX (PHORMIUM) REFUSE.

ITS MANURIAL VALUE.

B. C. ASTON, F.I.C., F.C.S.

NEW ZEALAND flax-refuse is the fleshy portion of the leaf of *Phormium tenax*, with some short fibre. The refuse accumulates as a waste product in the process of producing the fibre variously known as New Zealand flax, New Zealand phormium, or New Zealand hemp.

Dr. Purchas, of Auckland, in 1868 (Trans. N.Z. Inst., Vol. i, p. 69) stated that the refuse made "most excellent food for cattle." Certainly the well-chewed ends of flax-plants are evidence that stock to some extent find the leaf palatable, but I am unaware that any exact experiments have been carried out to show its food-value. A farmer who is grazing cattle on large areas of drained flax swamp in the Auckland Province informs me that he is positive that cattle eat the growing flax even when there is abundance of good grass available. Sir James Hector ("*Phormium Tenax* as a Fibrous Plant," 1889) mentions that if cattle have access to a field of flax which has been cut they will destroy the plants altogether by drawing out the young leaves to chew the butts, of which they are very fond. The same writer suggests that if the sodium-sulphite process be used to obtain the fibre the rejected portions of the leaves could easily be converted into papermaker's pulp. Professor A. H. Church (now Sir Arthur) some forty years ago (Trans. N.Z. Inst., Vol. vi, 1873) conducted a research of the chemical composition of the phormium-leaf, and suggested that the ash of the refuse would make a lye to be used for the partial cleansing of the fibre.

Seeking for a substitute for stable manure, a difficult substance to obtain in this country, where there is so little stall-feeding of stock, some years ago I suggested to Mr. J. D. Ritchie the advisability of experimenting with New Zealand flax-refuse, a complete analysis of which is given in my Annual Report for 1900 (see pp. 135-6, N.Z. Dept. Agric. Annual Report, 1900), and a partial one in my 1904 report (p. 137). Experiments were accordingly carried out at the Weraroa (Levin), Ruakura (Hamilton), and Moumahaki

Experimental Farms. On a clay soil resting on gravel, at Levin, potatoes were planted on the 5th October, and on the 6th November 2.19 in. of rain fell in fourteen hours. In these trials 5 tons of Up-to-Date sets, sown with no other fertilizer than flax-waste at the rate of 30 and 20 tons per acre, came away fully a week in advance of crops fertilized with artificials only, the former maintaining their growth right through the season. The 20-ton-dressed plot gave a crop of good quality, but not equal to that given by 2 cwt. super-phosphate; the 30-ton-dressed plot was very much better, being quite equal to the best of the artificially dressed plots (1907 report, p. 320). The Overseer, Mr. Drysdale, remarked that thousands of tons of this valuable refuse which could be made profitable use of were lying about unutilized at the various mills.

At Ruakura, on a sandy soil, 20 tons of flax-waste, without any other fertilizer, gave an increase of 2 tons 7 cwt. of potatoes over the unmanured plot—a profit of £6 19s. per acre due to the waste, after allowing 2s. 6d. per ton for cartage. The waste was valued at 2s. 6d. per ton (see Journ. Dept. Agric., Vol. i, No. 4, pp. 275–6), this being the actual cost of carting and distributing. The following are the actual results:—

	20 tons Refuse.	10 tons Refuse, 2 cwt. Bonedust, 2 cwt. Basic Slag.
Cost of manure	£2 10s.	£2 0s. 6d.
Yield per plot	1 ton	19 cwt.
Yield per acre	10 tons	9 tons 10 cwt.
Increase over unmanured, per acre	2 tons 7¼ cwt.	1 ton 17¼ cwt.
Value of increase at £4 per ton* ..	£9 9s.	£7 9s.
Profit per acre, due to manure ..	£6 19s.	£5 8s. 6d.

In order that it might be certain that no mistake had been made with reference to cost of carting and distribution of the waste, the matter was referred to Mr. Primrose McConnell, the farm manager at Ruakura, who replied that, in his opinion, 2s. 6d. per ton would in that instance cover the cost of carting and spreading, the charge being quite a fair one (the paddocks were comparatively near the flax-mill). Probably the profit would have been much greater had 30 tons instead of 20 tons been used.

* When potatoes are selling, as at present, for £8 per ton the actual gain from the manuring would be increased twofold.

An experiment was also made at the Moumahaki Farm by Mr. Gillanders, on a crop of mangels, with the following results (see 1907 report, p. 309).

	2½ cwt. Superphosphate, 28 cwt. Flax-waste.	56 cwt. Waste.
Cost per acre	£1 6s. 6d.	£1 8s.
Yield per acre (roots)	79 tons 4½ cwt.	15 tons 8¾ cwt.
Yield per acre (tops)	9 tons 7¼ cwt.	4 tons 10 cwt.
Increase over unmanured, per acre	70 tons 11½ cwt.	7 tons 6 cwt.
Cost per ton of increase ..	4½d.	3s. 10d.

As was to be expected, the flax-refuse by itself did not show up very favourably with this crop, but when combined with superphosphate, 2½ cwt. per acre, the treatment produced 70 tons of mangels at a cost of 4½d. per ton for fertilizer, and took second place in a trial with twenty-two different mixtures of artificial fertilizers, 5 cwt. of basic slag per acre taking first place and producing a crop at a cost of 4d. per ton.

Comparing flax-refuse with stable manure, it may be said that while containing similar amounts of water and phosphoric acid the refuse contains larger amounts of potash and nitrogen. It has, moreover, one very great advantage over stable manure inasmuch as it does not contain any weed-seeds, a fact which will appeal to the farmer.

Unfortunately, experiments on State farms do not always carry the weight with the average farmer that they should. There is perhaps the suspicion that the State farmer is able to employ means which are not within the reach of the ordinary farmer to ensure favourable results. One experiment in the Waikato by a flax-miller may therefore be quoted as showing the practicability of using the refuse as a manure. This gentleman used a heavy dressing of the refuse, ploughed in, and had a very heavy crop of pumpkins* as the result, *no other fertilizer being used*. He was quite satisfied with his experiment. Following the pumpkins a crop of oats was grown, with 2 cwt. bonedust and superphosphate; the crop was very good. Grass with 3 cwt. bonedust followed, and the pasture was all that could be desired. This gentleman made use of all the refuse, most of it being just spread on the grass paddock as a top-dressing, the results being highly satisfactory.

* The efficacy of flax-waste as a manure for pumpkins is also vouched for by a well-known Manawatu farmer.

"J. W.," Waimea West, writing to the *Journal* of the Department in January, 1911 (p. 52, Vol. ii, No. 1), says, "On my farm a few years ago a flax-mill was working, and where the pulp was scattered over the ground the corn grows and yields better than elsewhere."

It seems desirable that experiments should be made with high-priced crops like potatoes on land near flax-mills to ascertain if the waste could be profitably utilized.

TURNIPS.

THE turnip is a hardy biennial; its root is hard and woody in the wild state, but cultivation has converted it into the useful vegetable it is, though bad cultivation and unsuitable conditions allow it to revert at once to its uncultivated state. Turnips depend mainly upon an abundant supply of manure and water. Turnips are sown in Scotland on one-seventh of the total arable area, and are sown on light and strong land, on thin land and on deep, on every kind of arable farm. No matter what may be its climatic aspect, soil, or situation, turnips are sown. It is an expensive and precarious crop, subject to insect-attacks, to finger-and-toe, to drought, frost, mildew, &c. Denmark, for example, grows only 1 acre of turnips, mangels, kohl rabi, and other root crops for every 5 acres of corn, and yet Denmark is not a grain-growing country. If turnips are not grown, how is the fertility of the soil to be maintained? Denmark gives the answer: Where we have 7,000 or 8,000 acres of tares, Denmark has nine times as much. If, instead of growing 8 to 10 tons of roots which only give 1 ton of feeding-material, a mixture of tares, peas, beans, and oats were grown for summer feeding, and the pasture that would be grazed were made into hay for winter feed, how much more stock could be kept! The land would improve in condition, as turnips scourge it, while the tares, peas, beans, &c., would enrich it and keep it free from weeds.—*Dundee Advertiser*.



LINCOLN EWE HOGGETS ON HON. J. D. ORMOND'S KARAMU ESTATE.
HAWKE'S BAY.

WOOL COUNTS.

THE picture on the opposite page is the photographic reproduction of a cabinet containing specimens of wool, representing the various counts recognized by the woollen trade, which the Live-stock and Meat Division has had prepared for reference purposes. One of these cabinets is now displayed at every Stock Inspector's office throughout the Dominion for the convenience of farmers who may desire to make themselves better acquainted with wool-quality.

TRAINING FOR FARMERS' SONS.

THE practical training for young farmers that the Ruakura Farm of Instruction has for some years offered to the youth of the Dominion is about to be undertaken on almost identical lines in South Australia, as the following extract will show:—

For some time the South Australian Government has had under consideration the establishment of a training-farm for boys, with the object of providing for the youth who is inclined to go upon the land, but whose parents are not in a position to assist him to fit himself for such work. A few weeks ago the Minister of Industry and Agriculture announced that the arrangements for carrying the scheme into effect had been practically completed. Boys from fourteen to sixteen years of age are eligible for admission, and may stay at the farm for two years, or until they reach the age of seventeen, which is the maximum age at which they can remain in residence. They will be provided with board and lodging and an allowance of 1s. per week for pocket-money, and, in addition, provided their conduct is satisfactory, a bonus of £2 10s. will be paid into the savings-bank to the credit of their respective accounts. During their stay at the farm the boys will receive an elementary training in all branches of farm-work, including the cultivation of cereals, the care of sheep and poultry, and the handling of cows. It is anticipated that the scheme will be brought into actual operation before the end of February.

The South Australian proposal must be accepted as being modelled on the scheme of the New Zealand Department of Agriculture, which has been the pioneer in the farm-of-instruction scheme, initiated at Ruakura. Youths are also in residence at the Weraroa and Moumahaki Experimental Farms. The number of applicants for instruction at the three stations is already far in excess of the accommodation available.

Good cultivation, judicious manuring, and pure seeding are essentials to a bountiful harvest.



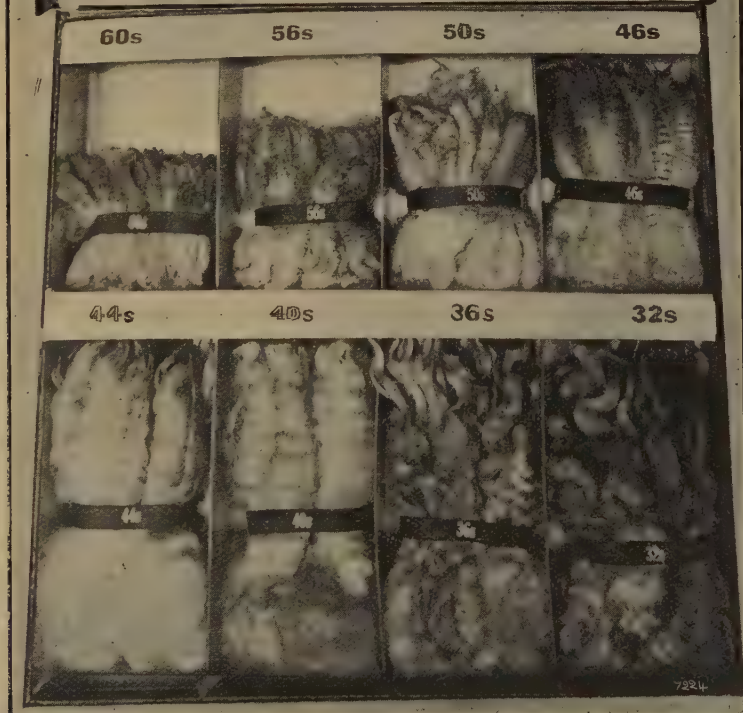
DEPARTMENT OF AGRICULTURE, INDUSTRIES, AND COMMERCE.

THE bulk of the New Zealand fleece wool is suitable for combing purposes, and the first treatment it is subjected to after sorting is scouring; then it is combed into tops. These tops have a certain spinning quality, and are designated in England by numbers. The general run of New Zealand qualities is given below with the reason for so calling them.

One pound of wool similar to that in the case marked 32s, when combed into tops will make 32 hanks of yarn, each hank being 560 yards long.

One pound of wool similar to that in the case marked 36s, when combed into tops will make 36 hanks of yarn, each hank being 560 yards long.

And so on with 40s, 44s, 46s, 50s, 56s, 60s, and even finer.



PLANT - SELECTION.

W. S. HILL.

THE improvement of plants by selection, which is one of the features of the new agriculture, is not, as many believe, a new science. It was an axiom of ancient growers of grain, and was probably known to the Chinese before the dawn of Western civilization. In bringing the many cereals and fodder plants known to the agricultural world to their present stage of perfection some process of selection has been continuously at work. Attention, however, has been directed to the great possibilities in systematizing the work by that pioneer in modern plant-breeding, Dr. Nilsson, the Swedish investigator.

A brief outline of the principles underlying Dr. Nilsson's work with cereals may not be out of place. Having secured by selection a large number of promising ears, he proved that each variety had many strains, each of which would breed true to type. To determine the most useful of these strains rows of equal length were planted seed by seed, and by comparison of the resulting produce he was able to determine which strain possessed the most desired characters. These strains breed true to type for many generations, and the value of a pure strain of any cereal compared with the ordinary commercial sample is most marked. The distinguishing features which have appealed to the grower are purity of sample, evenness of ripening, and increased yield.

Nilsson was also able to determine the effect of environment on selected plants. It is by the produce of individual plants in the next generation—when the influence of environment has been eliminated—that the true comparative value of the individuals is demonstrated. Thus there is the necessity for classing plant-breeding work under two main heads: (1) Selection throughout the country; (2) testing at plant-breeding stations, preferably in the locality in which the selections are made.

While other and older countries have given us improved strains which are being grown in increasing stocks in this country, something is being done by New Zealand investigators to carry on work under local conditions. The necessity for this is apparent, as selecting from acclimatized plants must ensure results of a more lasting character. Again, varieties suited to one locality are entirely useless in many

others, hence local selection is always of more economic value than working with types produced in a foreign country. The wide range of soils and climatic conditions in New Zealand point to the advisability of each district selecting from its own pastures forage and cereal crops.

Plant-breeding is at present being carried on at Canterbury Agricultural College by Dr. Hilgendorf, who has already obtained promising results in the improvement of well-known varieties of wheat and oats. At Ruakura Farm of Instruction, the Horticulturist, Mr. Green, has done very valuable work in the selection of a rust-resisting strain of oats and the improvement of certain grasses. Indications at Moumahaki Experimental Farm point to improvement in many grasses and forage crops, notably cocksfoot, silver-beet, and lucerne. In all, only a dozen pairs of eyes have been systematically selecting types from our crops, and the area covered has been very, very small; yet most encouraging results have so far been obtained. Here is presented an excellent opportunity for agricultural instructors to do work of great value. Most of our country offers virgin ground for selection, and if the boys and girls of our country schools could be interested sufficiently to bring to the school-gardens any plants they see which show better growth than the average plant of that variety, then thousands of pairs of eyes, instead of a dozen, would be searching for improved plants. No finer training for the farmer's child could be afforded than that of observation of nature, and continually seeking for something better, with the aim of advancing individual and national progress. Many teachers taking elementary agriculture as one of their school courses find that they have run through the class of experiments that they can easily perform on the land at their disposal, and if any such teacher desires a new useful course of work of great educational value for his pupils he could not do better than apply to one of the three students named for particulars as to the methods of making selections. Should any strain prove valuable, it could be named after the school from which it was sent. To quote two examples of what has been done by chance selection: Rape, the mainstay of the fat-lamb industry, is said to have originated from a wayside plant; while Western Wolths grass, an improvement on Italian rye-grass, started from a robust plant found by a small farmer in Holland.

That there are thousands of exceptionally fine individual plants existing in our pastures and crops to-day there is no room to doubt. Some of these may be secured by those already on the alert. How many more would be secured if the schools took up the work of selection! The field for activity is great indeed, and, did the subject attract the individual attention it should, the possibilities of plant-breeding in this country are practically unlimited.

RUAKURA FARM OF INSTRUCTION.

A DIGEST OF THE WORK OF THE YEAR.

PRIMROSE MCCONNELL.

THIS is not meant to be a report of the results of experimental work—that will follow in due course—but is merely a sketch of Ruakura Farm of Instruction for the information of those who have not visited it and who are justly entitled to know whether the expenditure on the farm is justified by the work that has been undertaken and the results already achieved by, or reasonably expected as following on, the year's operations.

It is perhaps not sufficiently recognized that the main work on this farm—until recently, that is—could not be otherwise than in the direction of improvement; as a matter of fact, there still remains a great deal to be done in this direction. Every credit is due to those who have shared the initial reclamation work. Much correct experimental work could not be expected from a poor kahikatea swamp in its unimproved state. The whole conditions are now rapidly changing, and on no estate I know of is there such scope for the experimentalist.

It is a gratifying fact that if the whole estate were put up for public sale to-day it would realize nearly a cent-per-cent. profit on the original purchase-money and all expenditure on the farm up to date combined. This is quite apart from the value of the experimental work that has been carried out.

There is so much variance of opinion as to what an experiment farm really is or ought to be that this question may be briefly referred to. The ordinary farm is operated on purely commercial lines, with profit as the main object. The objective of the experiment station is to increase our knowledge of all branches of agriculture. As soon as the fiat goes forth that an experimental station must be a directly paying concern its real object is lost sight of and it ceases to exist as an experiment station in the correct sense of the word. Such a conclusion does not infer that expenditure on an experiment station should be unlimited or lavish, but it is not sufficiently recognized that careful experimental work must of necessity be expensive; in fact, the outsider has little idea of the amount of labour—expert and other—that is necessary in this connection. In



POTATO-TESTING PLOTS AT RUAKURA.

my own opinion the main features of an experiment station should be animal and plant selection and animal and plant pathology, although there are many other things which an experiment station must of necessity deal with. I also think that it is not sufficiently recognized that a failure in experimental work may be as meritorious as success, and that a pat on the back under the former circumstances may be appreciated more than fulsome praise under the latter.

Perhaps the most pleasing feature of the past year is the fact that the interest exhibited by the farming community in the work of the farm has increased by leaps and bounds, and also that numerous appreciative encomiums have been received, by letter and in person, from farmers who have visited this station, and who have admittedly derived valuable information from inspecting the various experiments in progress. During the past twelve months, roughly speaking, over three thousand visitors have inspected the farm. These came not only from all parts of New Zealand, but from all parts of the world. Moreover, visitors are still on the increase, so much so that this phase of the farm-work is becoming a difficult matter to cope with, and, of necessity, is a tax on my own time and that of the overseers of the different divisions. Last month (November) upwards of two hundred visitors inspected the farm, and this does not include a large number who investigated either the apiary, poultry, or dairy divisions only.

During the past twelve months over a thousand queries from farmers in connection with all branches of farming have been replied to by letter, and many more have been replied to verbally. I may state that these queries do not include any in connection with veterinary work, all of which are invariably passed on to the local veterinary officer of the Live-stock and Meat Division. It is not pretended that all replies to inquiring farmers are without flaw, but it is trusted that, generally speaking, they will be a help to those seeking advice and information. In this respect also I have found that inquirers are invariably appreciative of information, as evinced by the numerous acknowledgments received.

Plant-selection work has been considerably developed. Over and above the work in the nursery proper, a 14-acre paddock has been set aside for this purpose, one-half of which is devoted to cereals, of which there are 60 varieties, the other half being utilized for potatoes (220 varieties) and forage crops. The cereals are not only valuable from a plant-selection standpoint, they are useful as a demonstration of the suitability or otherwise of the different varieties for this district. They are also of utility from the fact that they demonstrated the extent to which each variety will overcome the various diseases.



Up-to Dates with no manure.

Up-to-Dates manured with $\frac{1}{2}$ cwt. each of bonedust, basic-super., Seychelles guano, and sulphate of potash per acre.

POTATO EXPERIMENTAL PLOTS AT RUAKURA.

A new wheat-introduction from Australia promises exceptionally well. I may state that the experiments in this field have been especially appreciated by visitors. In the mangel-paddock—20 acres—experiments are in being to determine the results from ploughing at different depths and at different periods of the year. In this field sulphur and lime are also being experimented with from a disease-preventive viewpoint. The manurial value of sulphur is also being tested. Selections from disease-resisting varieties of mangels and swedes have also been made, and grasses have not been overlooked. In this respect I must state that some thousands of grass-plants of suitable varieties have been raised in the nursery, and despatched for regrassing denuded lands both north and south.

A large number of forage plants are being experimented with, and include several mixtures of the legume and non-legume. These crops are fed to the dairy herd, and, apart from the valuable information obtained regarding the nature and capabilities of each variety, they afford a practical demonstration, and one of the utmost importance to the dairyman, with respect to their feeding-value for milking-cows, and their resultant effect on the milk-yield. Here, again, I may mention that the practical farmers visiting the farm express unqualified appreciation of these experiments. In connection with manurial experiments a set has been instituted to determine the influence of manures on the feeding-value of pastures. This should prove of great value to the Waikato. Green-manuring experiments (12 acres; legume *versus* non-legume and *versus* bare fallow) are also in being. A new set of manurial experiments (14 acres) has been instituted to determine results when a manure or mixture is applied to the same plot year after year. In all there will be fifty manurial plots in this paddock, and I can safely state that the work in connection with these acres alone will be greater than that necessary in cultivating the ordinary farm of 200 acres. As far as I know, Rothamstead is the only experimental station which has carried out similar experiments long enough to be of much value. If carried out for some years they should be of great value to this district. Numerous variety and manurial experiments are in being in all root and forage crops, and new varieties of forage plants are under test. There are also a number of top-dressing experiments.

Areas of swamp land of similar quality, recently reclaimed, are undergoing different systems of cropping in order to determine the most economical way to bring such land into profitable cultivation; and, as there are some thousands of acres of similar land now lying dormant and adjoining this station, he may be reckoned a public benefactor who will evolve a system of bringing this apparently almost sterile land into a profitable state of cultivation in a reasonably short



RYE-CORN AT RUAKURA.

time. The fact that a lucerne-paddock has been successfully established on this swamp soil is something of which the farm may justly feel proud, and the indirect benefit derived therefrom can only be estimated by many thousands of pounds.

A rust-resistant oat has been raised by Mr. Green, Horticulturist at this station, which, so far, more than justifies its name. The value of this introduction can scarcely be estimated, as it is certain to spread over the whole oat-growing world. Already supplies of it are being eagerly sought by one of the Agricultural Departments of the Commonwealth.

An effort is being made, by selection, to raise the standard of the stud stock. Important experiments in fat-lamb breeding have been carried out during the season, and in this connection the necessity for some succulent feed other than grass just before and after lambing has been clearly demonstrated, and its production, even at a considerable outlay, amply justified.

In connection with calf-rearing, an experiment has been made with feeding the raw crushed linseed, instead of the boiled or scalded linseed, with the separated milk, and this has proved an unqualified success. Calves do equally as well on the raw meal, and much time and labour is saved.

In connection with the stomach-worms in sheep, tobacco-feeding has been continued. At present there is no evidence of this parasite. I do not believe this is a cure, but it is a preventive to a considerable extent if placed within reach of the lambs as soon as they are born.

In the orchard numerous spraying compounds and blight specifics have been tried, and visiting orchardists have exhibited keen interest in, and appreciation of, the various experiments for the control of orchard pests.

The poultry and apiary divisions are always an attraction, and prove of interest to those visiting them, and these have been exceedingly numerous.

The Poultry Overseer has carried out important experiments in incubation. His advice and the benefit of his experience have been in frequent request, and many appreciations of the information supplied have been received. The poultry supplied has been much in excess of the operations of previous years, and the number of orders received for eggs during the season was simply abnormal. So unprecedented was the demand that the Overseer found his supplies taxed to the utmost. Just 845 settings were supplied, and, these being from valuable birds of carefully selected strains, their distribution should do much to improve the poultry stock throughout the Dominion. The increased general interest exhibited in this industry, in so far as the poultry



BARLEY AT RUAKURA.

division at this farm is concerned, may, I think, be assumed as a fair indication of confidence in, and appreciation of, the work being done at this station.

The dairy section is always an object of much interest to the majority of visitors, and much favourable criticism of our operations has been expressed by the many practical dairy-farmers who have called. In our Jersey cows there is the foundation of a good herd, and last season the demand for sires far exceeded our supply. All we had were sold at satisfactory prices, the careful record that is kept of the performances of the several dams being of value to, and appreciated by, the purchasers. Numerous inquiries are to hand for Shorthorn bulls of the milking strain, and, as showing the confidence that is now being placed in this breed, I may mention that a newly dropped calf from one of our best cows was sold for £35. It is hoped that our small herd of non-pedigree Shorthorns will be improved by the importation of a few of the best that can be purchased.

Perhaps it will be permissible to mention one other item of the year's operations which is shared in common with the other experimental stations and which has entailed no inconsiderable thought and labour. I refer to the preparation of authentic exhibits and information for the various shows throughout the Dominion. In this matter this station has performed its due share in imparting to those farmers in every part of the Dominion who have not been able to personally inspect the various experiments in actual progress the results achieved after the work of the season. Those whose duty it is to be in attendance at the shows know how keenly the work of the experimental farms is appreciated by the practical farmers in whose interest the several experiments are carried out, and how these exhibits are the source of hundreds of inquiries regarding the proper methods of cultivation, and the capabilities of the various crops. Only those who have the responsibility of preparing the exhibits can have any idea of the mental and bodily work entailed in assuring that they shall be absolutely authentic.

It may be of interest to note the number on the staff of the New York Experimental Station as compared with this or any other of our experimental farms. The New York station is not by any means considered to be the best equipped in that quarter of the globe, and yet the staff consists of a Board of Control of eight members, one president, one secretary and treasurer, two agriculturists, five bacteriologists, three botanists, nine chemists, one dairy expert, one editor and librarian, four entomologists, six horticulturists, one soil-investigator, two special agents, one director's secretary, six clerks and stenographers—a total of forty-three, not counting the Board of Control or the outside working staff. The annual grant towards

conducting this station is £36,800. I can only state that if results are in proportion to the number of the scientific staffs of the American stations all agricultural problems should soon be solved. As the New York station is only one among many others in North America, the total expenditure in experimental work there must be very great.

This article is not meant to be an apology; it is intended as a plain statement of facts. We are still in the initial stage, and there is enormous room for improvement and development. It is not even put forward that the management is as it should be—it may not be as it could be—but I have no hesitation in stating that the hearts of all those in authority at this station are in the work allotted to them, and for anything that may have been accomplished I am deeply indebted to the loyalty and *esprit de corps* of the whole managing staff. It will also be easily realized that with the introduction of the cadet system the management of this station has developed into something that is no sinecure. Keeping in view the fact that the successful farm of the future will be comparatively small and highly cultivated, all cultivation-work at this station is being carried out on intensive lines. It may be asked, "Does the work of the year justify this farm's existence?" This report is the only reply I can make.

A National Dairy and Cold-storage Congress will be held at Ghent during the forthcoming international exhibition in August. Two of the subjects to be dealt with in the main section will be "The Obtaining and Preservation of Raw Milk" and "Rapid Methods for the Control of the Purity of Lactic Fermentation." In the cold-storage section one of the subjects set down for discussion is "Laboratories for Research on the Subject of Cold Storage." The secretary of the Congress is M. O. André, 59 Avenue des Arquebusiers, Brussels.

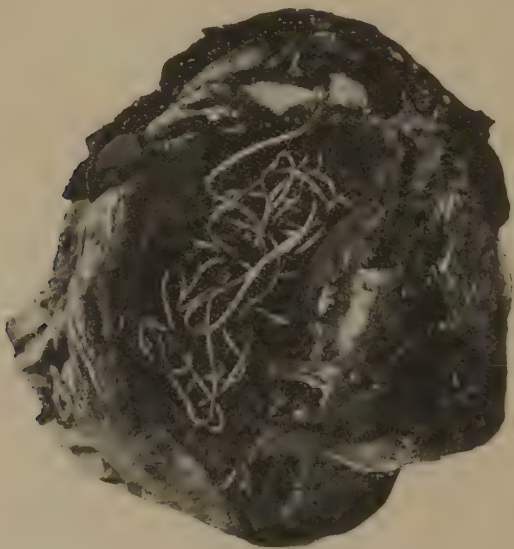


RUAKURA SOUTHDOWN RAMS.

FILARIASIS OF DOGS.

C. J. REAKES, D.V.Sc., M.R.C.V.S.

THE value of the quarantine system as applied to imported animals was well demonstrated in a recent case which occurred in Auckland. A dog brought from one of the Pacific islands was found, while undergoing detention at the quarantine-station, to be affected by the condition termed filariasis—in other words, to be harbouring in its system parasitic worms of the class termed *Filaria*. A popular term for the particular affection present in this case is "heart-worm," the parasites being present in the heart itself (see photograph). The



HEART OF DOG.

Right ventricle laid open, showing parasites (*Filaria immitis*).

mature worms are of considerable size, one taken from the heart of this particular dog being 7 in. in length, and, as will be gathered from the photograph, several of these were present, all being located in the right ventricle. Outwardly the animal showed no indication of sickness or of any trouble whatever, and the presence of the parasites was only determined by the fact that, as a proper precautionary measure, a small quantity of blood was obtained during life and

subjected to microscopical examination. This clearly demonstrated the presence in the blood of the parasite in a very early stage of its existence. The presence of the parasitic disease being thus proved, the animal was destroyed, and a *post-mortem* examination conclusively confirmed the opinion previously formed.

The particular parasite responsible for this condition is named *Filaria immitis*. It affects dogs in many parts of the world, particularly in India, China, Japan, the Pacific islands, and the southern States of America. Cases are also stated to have been met with in Denmark, Italy, Germany, and France.

So far as is known only one case has been met with previously in New Zealand, and in this particular instance, which occurred several years ago, it is impossible to ascertain whether the dog was an imported one or not. Although dogs infested with these parasites do not show, in the majority of cases at least, any signs by which their presence can be told by the ordinary observer, it has been noticed that symptoms of circulatory interference can often be detected. Thus, lameness of one hind leg, with wasting of its muscles, and even partial paralysis. This has been noticed in animals of the Great Dane breed. Owing to the parasites interfering with the circulation of the brain, fainting and convulsions may occur, and often the animal may become dull and snappish. Emaciation and weakness are generally seen in the later stages.

Some Bacteriological Effects of Liming (Iowa Agric. Expt. Sta., Research Bull. No. 2).—The effects of applications of ground limestone on crop-yields, the total number of bacteria in the soil, and the number of bacteria of certain groups were determined, and an attempt was made to correlate the three phenomena. The ground limestone was carefully mixed with three different lots of soil in pots at the rates of $\frac{1}{2}$, 1, 2, and 3 tons per acre, and the pots were kept at approximately uniform temperature and moisture-content throughout the experiment. After the lapse of a month the soils were sampled, the sampling being repeated three times at intervals of two or three weeks; at each sampling the number of bacteria was estimated. It was found that the applications of limestone had resulted in an increase in the number of bacteria in the soil, and the increase was almost proportional to the amount of limestone applied up to 3 tons per acre. In all cases the largest percentage of gain in bacteria was shown at the first sampling. At subsequent dates differences occurring in all the soils, both treated and untreated, obscured to a greater or less extent the differences due to liming. The applications of limestone were also found to increase the ammonifying, nitrifying, and nitrogen-fixing powers of the soil, the increases in each case being found to be almost proportional to the weight of limestone given. In the case of crop-yields the smaller dressings had little effect, but with the 2-ton and 3-ton applications the crop was materially increased. The nitrogen-content of the crop was increased to a much greater extent than the weight of the crop itself.

CROSS-FERTILIZATION OF PEAS.

W. H. TAYLOR.

To be constantly on the alert to improve strains or to perpetuate a good one is an important objective of the thoughtful horticulturist. All hybrids are so impregnated with mixed blood that they are ever liable to sport or break off into some variation. Constant inbreeding — or self-fertilization — has a weakening effect. The length of time before this weakening becomes very noticeable varies in different varieties, being ruled mainly by their inherent strength or the potency of the blood that had greatest influence in their origin. Sooner or later a variety loses its value, and a successor becomes necessary. New varieties may be obtained either by cross-fertilization or by the natural tendency to sport or vary without cross-fertilization. Cross-fertilization may be by artificial or by natural means. By artificial I mean hand-pollination; natural means are by pollen conveyed from other flowers by bees and insects. In the former case only a limited number of flowers can be dealt with, and the result must always be doubtful, for there is at all times the sporting tendency to contend against, which renders the most careful hand-fertilizing purely speculative. The natural means afford a much wider field, and, certain plans or designs having been carried out, the watcher's work is confined to selection. I am of opinion that most of the new varieties are obtained by selection, and that very little hand-pollination is in reality ever done. Having regard to the various agencies at work, and the limited number of flowers that can be hand-pollinated, I regard such efforts as misdirected. In field or garden culture the natural agents are continually at work, and a large proportion of the flowers are visited. It only requires an intelligent scheme of planting to be initiated and carried out, so as to force the right kind of pollen on the insects, and there is sure to be a wide field for selection.

I have had considerable experience and practice in hand-pollination of plants in glasshouses, and I know it is impossible to be sure of results. As evidence of this uncertainty I may mention that one of the finest primulas in cultivation—Sutton's White Queen—was obtained from a cross of two crimson varieties. Also, if you save seed from a crimson anemone of hybrid strain you may with reason expect to obtain flowers of all colours from it. I think it will be admitted



SHERWOOD PEAS (ACTUAL SIZE).

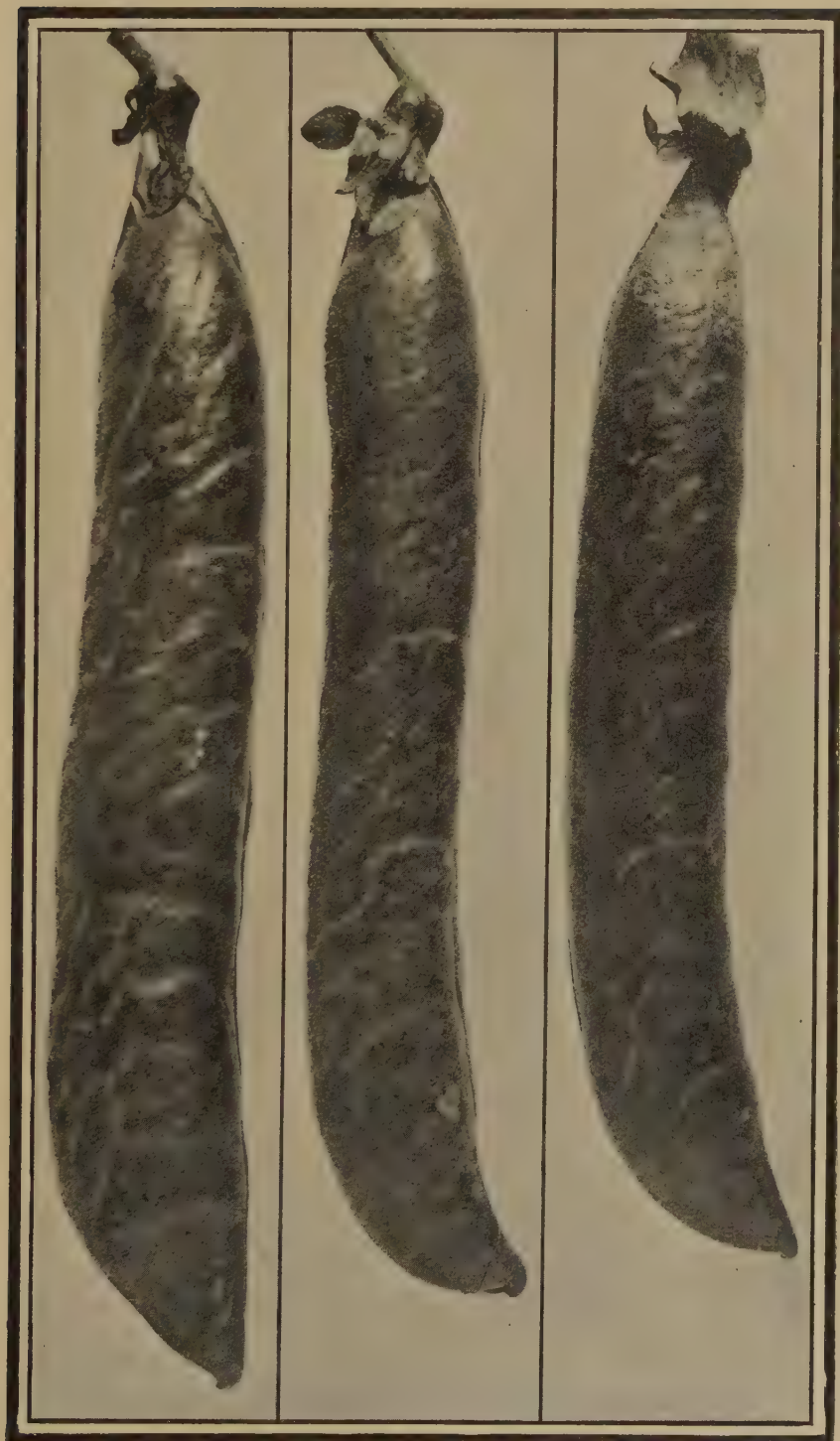
Showing variations from common type, the peas on the right being "sports."

that the proper and most profitable way to work, then, is by selection, leaving fertilization to the natural agencies, but influencing their work by supplying pollen from varieties having qualities we wish to amalgamate. New varieties may originate that are not influenced by outside aid, but are the result of the sporting nature above referred to. The agencies that have been at work will, however, matter nothing to the watcher who sees a good new variety, and it may be impossible to determine the origin. But continued observations carried on over a number of years will at least prove that the natural sporting habit has a strong influence in the process of evolution, and that all personal efforts may prove nugatory.

The varieties of peas illustrated are surely conclusive evidence on this point. In 1911 a small quantity of Sherwood was sown for seed-production. The two sports illustrated appeared in the row. They were carefully rogued out—an easy matter, as the plants were far apart in the row, being thinly sown. The remainder of the seed was saved and planted this spring—1912. Again, the same variations have appeared, which seems to prove an inclination to sport in those directions. The experiment now, unfortunately, ends, all the produce being required for use on the farm. The illustration shows the two sports and the Sherwood type.

The other variety illustrated—Quite Content—was sent me by a friend for trial. It is the largest-podded variety I have grown or seen. The pods contain from five to ten peas of large size, but the table quality I have not yet tested. The haulm will grow to a height of 10 ft., but as this is an unwieldy height it is not advisable to allow it. It may be given sticks 5 ft. or 6 ft. high, the points of shoots being pinched when they reach the top. Its branching habit will then be strengthened, and the stick be well furnished. It produces a good crop under these conditions, and is an object of interest well worth having in the garden. The plants should not be crowded, 4 in. to 6 in. apart is near enough. Thin to that distance rather than sow too thinly, so as to allow for accidents. This variety would prove unsatisfactory if allowed to lie on the ground.

Winter Spraying of Apple-trees.—On apple-trees in the orchard at Ruakura Farm of Instruction this season results point to Bordeaux being better for winter use than the lime-sulphur solution. Trees sprayed with the winter formula of the lime-sulphur solution required the addition of the summer solution to the first application of arsenate of lead for codlin-moth. Trees, on the other hand, sprayed with the 10-10-40 Bordeaux mixture did not require the addition of the summer formula to the arsenate spray.



QUITE CONTENT PEA (ACTUAL SIZE).

LUCERNE AT RUAKURA.

PRIMROSE McCONNELL.

I HAVE much pleasure in reporting the continued, and every day more pronounced, success of all lucerne plots sown last year, including the 9-acre paddock already reported on. Six crops have been reaped from this paddock since it was sown in November of last year—a little over twelve months—and at the date of writing (28th December) the second crop of hay of this season is already in the stack and the third is making rapid progress. I have no hesitation in stating that the last crop, just previous to being mown, was one of the most vigorous and healthy lucerne crops I have ever seen, and no top-dressing of any kind has been applied this season.

The plot in the poultry-yard, which was sown on the 12th December, 1911, has since that date yielded seven heavy crops, and another—the third of this season—is being mown. The weight of fodder (an accurate account of which is being kept) produced from this small area, one-fifth of an acre, is remarkable. The rate of growth of the crop now being cut is considerably over an inch per day.

The variety plots in the nursery, nine in number, have already been cut over twice, and the third crop is nearly ready. Two of these varieties (Arabian and Peruvian) have made the splendid growth of 20 in. in fourteen days. This is scarcely credible, but it is a fact nevertheless. Each cutting of the different varieties is carefully weighed, and the habit of each noted, in order to determine their order of merit at the end of the season.

Two new varieties famed for their hardiness have been secured from the Guelph College, Ontario—namely, Grimm's Alfalfa and a variegated variety. These have been sown, and so far are promising well.

In the experiments "inoculation" *versus* "no inoculation" *versus* "farmyard manure but no inoculation" the last-named shows to great advantage at present.

This season a small plot has been established on the red clay of the Big Hill paddock. It is promising to be a success. For the coming season it is intended to lay down a 20-acre paddock. The fact that lucerne has been established on the various soils of this station should encourage all and sundry to make the attempt even on the most unlikely soil. The manures principally used here are lime in the first place and a mixture of basic slag and Seychelles Island guano.



LUCERNE AT RUAKURA, SHOWING A GROWTH OF 20 IN. IN FOURTEEN DAYS.

TWO SHEEP - DIPS.

Nor only to ensure the efficacy of the work of dipping but to make it as expeditious as possible, while reducing the strain on man and beast, it is essential that the "dip" and its appointments should be made on an approved plan. To those contemplating the construction of a dip the accompanying plans are submitted for their guidance. Both plans are more particularly suited for large dips, for companies, co-operative societies, saleyard companies, or large holdings, but may be modified to meet the requirements of small flocks. The "walk-in" dip is recommended in preference to the "slip-in" dip, especially where many sheep are being handled.

The dripping-yard is divided into three pens, as a third pen is sometimes found useful, but if it is considered that two are sufficient the yard may be simply divided by a central fence. Instead of having the top of the concrete wall of the dip level with the ground it will be found advantageous to have it about 18 in. above the ground-surface and reinforced with steel wire or hoop-iron.

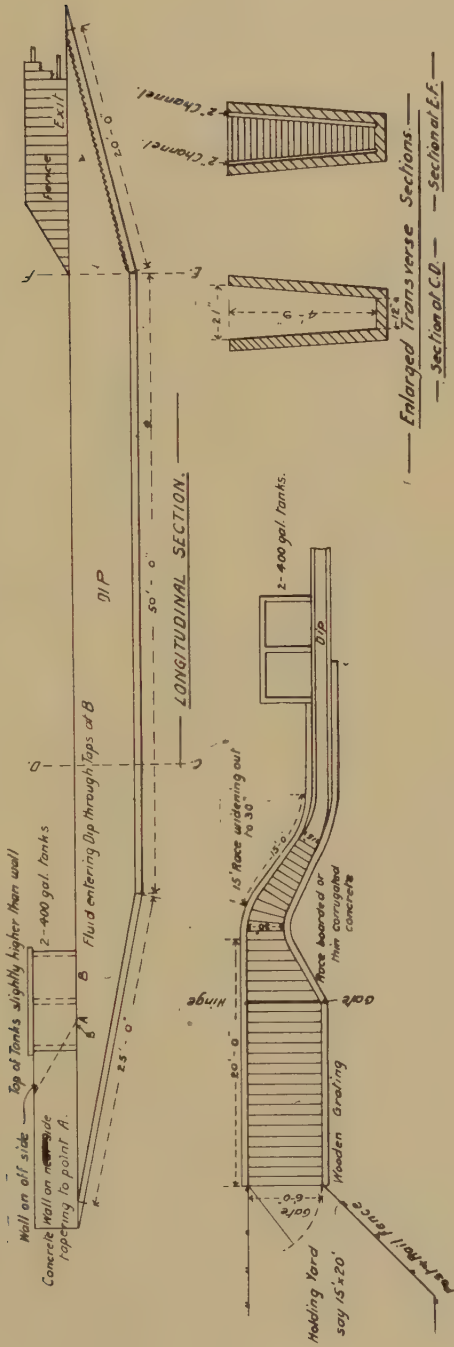
The plans referred to are on the following three pages.

HIGH PRICES FOR SCOTTISH SHORTHORNS.

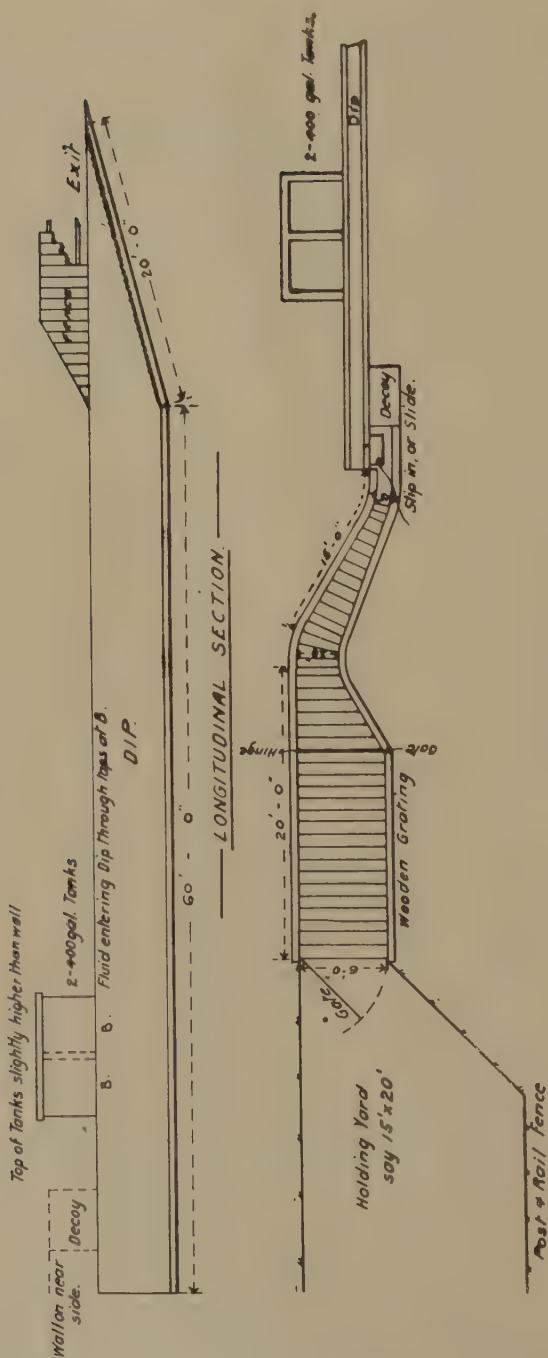
MR. GEORGE CAMPBELL, Bieldside, Aberdeenshire, a well-known exporter of purebred Shorthorns to the Argentine Republic, has obtained, at a recent sale in Buenos Ayres, an average of £972 13s. 6d. for eight bulls and £229 10s. for eleven cows and heifers. The top price (£3,144) was got for the rising two-year-old sire Sunbeam's Pride, by the famous Pride of Avon. Sunbeam's Pride was bred by Mr. McWilliam, Garbity, and sold at the Perth spring sale in February last for 130 guineas. The next highest figure (£1,746 13s. 4d.) obtained in the Argentine by Mr. Campbell was for the rising two-year-old sire Scottish Crest, which he purchased at Perth in February for 86 guineas.—*London Morning Post*.

According to a report by H.M. Consul-General at Odessa, the wonderful fertility of the black-earth soil of Russia has begun to show signs of deterioration, and it is clear that if the Russian crop-yield is to be brought up to Western Europe standards, or, indeed, kept from shrinking away, greater use must be made of artificial manures.

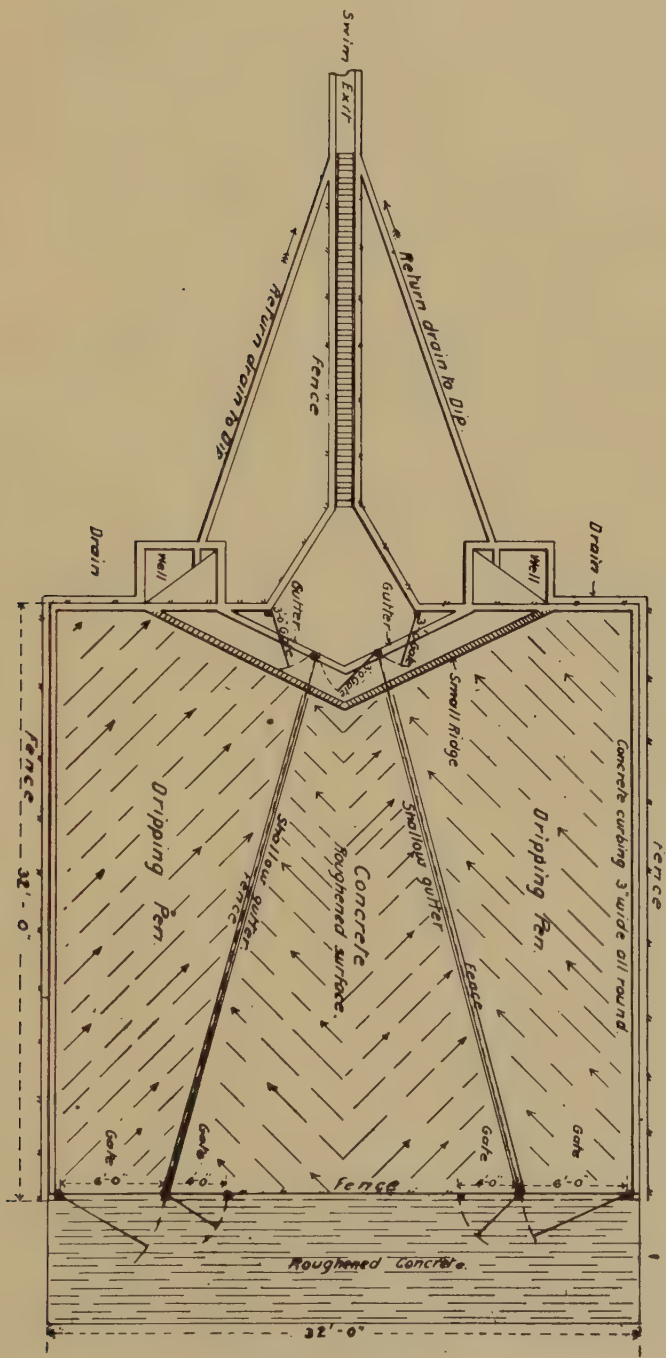
SKETCH PLANS OF TWO MODEL SHEEP DIPS.



WALK-IN DIP.



SLIP-IN DIP.



DIPPING-YARD.

POTATOES.

THE QUESTION OF MANURING.

T. W. LONSDALE.

IN many countries farmyard manure is regarded as essential in the manuring of potatoes, and the writer has frequently used as much as 20 tons per acre when growing potatoes on an extensive scale. To many growers, especially in the Southern Hemisphere, this may appear to be a heavy and expensive manuring, and probably as good results might be obtained by using half the quantity of farmyard manure combined with artificials. As cattle and horses are not usually housed in New Zealand, farmyard manure is practically an unknown commodity, and the potato-grower must therefore rely on artificial manures.

That the plant readily responds to a liberal dressing no one will deny, but it is questionable if the crop always receives judicious treatment. The requirements of the plant are nitrogen, phosphates, and potash, a combination that forms a complete manure. Probably no other plant responds so readily to the application of a complete fertilizer. The scientific aspect of the manuring of potatoes was discussed in an article by Mr. B. C. Aston, Agricultural Chemist, in the *Journal*, Vol. iii, No. 1, page 55.

The grower who specializes in potato-culture should ascertain by experiment the plant-food contents of his land, and manure accordingly, thus placing direct to his credit that which might otherwise be lost by application of unnecessary fertilizers.

During the past year trials have been conducted at the Mounahaki Experimental Farm. Four plots of equal area were treated with different fertilizers, and these plots were controlled by others to which manure was not supplied, the average of the latter forming the basis of computation. The land on which the experiment was conducted was previously old pasture composed chiefly of Chewing's fescue. This was ploughed in August, 1911, disced four times and cross-ploughed late in September. The potatoes were planted in November. The season was wet, cold, and stormy throughout. There was very little blight. When lifting the crop the total yield of each plot was weighed. In order to compare the profit per acre, due to the application of manure, the crop was valued at £4 per ton.

The returns show a remarkable difference in the yields of the manured portion and the untreated part of the crop. Throughout the period of growth the foliage on the plot treated with a complete manure was more vigorous than the other portion of the crop, and the plots receiving potash produced the most marketable tubers. Following are the particulars of the plots:—

Number of Plot.	Kinds and Quantities of Manures per Acre.	Cost of Manure per Acre.	Yield per Plot= One-tenth Acre.	Yield per Acre.	Increase per Acre over Average of Unmanured Plot.	Value of Increase per Acre at Current Market Rates.	Profit per Acre due to Application of Manure.
		£ s. d.	T. cwt. qr. lb. 0 13 1 26	T. cwt. qr. lb. 6 15 1 0	T. cwt. qr. lb.	£ s. d.	£ s. d.
1 and 6	No manure .. ..	.. ..					
2	4 cwt. superphosphate, 1 cwt. sulphate ammonia, 1½ cwt. sulphate potash	2 18 6	1 9 2 11	14 16 0 0	8 0 3 0	32 3 0	24 4 6
3	4 cwt. superphosphate, 1 cwt. sulphate ammonia	1 16 0	1 3 2 17	11 16 2 0	5 1 1 0	20 5 0	18 9 0
4	4 cwt. superphosphate	1 0 0	1 3 0 22	11 12 0 0	4 16 3 0	19 7 0	18 7 0
5	4 cwt. superphosphate, 1½ cwt. sulphate potash	2 4 6	1 7 0 22	13 12 0 0	6 16 3 0	27 7 0	25 2 6

THE CULTIVATION OF THE VINE UNDER GLASS.

(Continued.)

S. F. ANDERSON.

CONTROLLING THE FRUIT CROP.

WHEN the vine is furnished with well-grown rods (see Fig. 7, last issue) the joints should be 7 in. to 8 in. long—an inferior rod should be replaced by a better, as shown in Fig. 6—and the fruit-bearing laterals should be 14 in. to 16 in. apart on either side of the rod (see Fig. 11, last issue). If this is so there is never any need for cutting away laterals to increase the distance. One bunch only should be allowed to mature on each lateral. A vine would then be bearing a heavy crop—in fact, such a crop should not be allowed until the fifth year from planting. In the case of Gros Colman, Barbarossa, West St. Peters, and other kinds growing very large bunches the size and weight of the bunches have to be considered when thinning out the fruit. The permanent vigour of the vine, the perfect colouring and condition of the fruit, and the general healthiness and power to resist disease under the forced conditions of a glasshouse demand moderation in the amount of fruit the vine is allowed to bear. The experience of the writer is that growers of really good grapes seldom fail to obtain prices that remunerate them for their care and skill, and especially in limiting the crop to the strength of the vine. Several rules have been given as to what a vine should bear. It is little use quoting them, because if the conditions mentioned in this paper are observed good results would be obtained.

The method of training and pruning the vine described in this paper, known as the “rod and spur,” is the one generally adopted. It is the simplest and best for nearly all vines under glass.

THINNING OUT THE BERRIES.

To get really fine fruit the thinning of the berries is an important item in grape-culture under glass. It may be stated generally that from one-half to two-thirds of the berries may be cut from the

Black Hamburgh, Gros Colman, Alicante, Gros Maroc, Foster's Seedling, and Mrs. Pearson. The fruit of the more open bunches, such as West St. Peters, Pearson's Golden Queen, Barbarossa, and the Muscats does not call for the same amount of thinning. This must be left to the judgment of the grower. When this work is carefully done there is no loss in weight of the crop, but considerable added value from a commercial point of view because of the increased size and more attractive appearance of the berries. Expertness at thinning the fruit can only be gained by practice; no special rules can be laid down. It is best to commence at the point of the bunch and work upwards. The berries are mostly in groups of three, with the best at the end. In that case the one on either side can come out, but this is not always so. If the bunch is symmetrical each section of it can be followed up at a time. Great care must be exercised in handling the berries, as the slightest bruise turns black, and if the berry does not fall altogether it is permanently disfigured. By the time the thinning is completed the berries will probably be nearly as large as peas, or a quarter of an inch in diameter. Then comes a short period when there is apparently very little movement. The bunches after thinning look as if the vines required a stimulant. That is not necessary, however, if the treatment has been good in the way of manuring and cultivation.

VENTILATION.

Fresh air is necessary for the health of the vine. In most houses, owing to their construction, there will always be some movement in the air however slight. Draught must be carefully guarded against, especially so from the time the vines are pushing into leaf. During this period up to the time the grapes begin to colour the bottom ventilators should be rarely used, in order to avoid draught. If good top ventilation be provided the heat of the house will always draw in sufficient air from the lower part to provide the circulation necessary. It is sometimes difficult to regulate the temperature with hot bursts of sunshine and clouds alternately. Provided, however, plenty of air is admitted at the top, these sudden fluctuations will not do any harm in a cool vinery. It is a great check to allow a house to go up to 80° or 90° in the morning and then open wide top and bottom ventilators. The supply of air should not be given so much for lowering the temperature as preventing it rising too high. On a very hot still day the doors may be opened for a time. To quote from Mr. E. Molyneux's little book on "Grape-growing": "Commence early to give air, increase it as the temperature progresses, and reduce both in the same manner, is the common-sense method of giving air to vines, or anything else for the matter of that."

APPLYING WATER.

If the vine-borders have been prepared as advised in the article on "Cool Vine-house" no trouble is likely to be met with in the application of water. The vine-borders should be frequently cultivated inside and out, as where this is done the condition of the soil is brought under the notice of the grower, and, if too dry, water can be applied. Much depends, however, on local conditions. The borders of many vine-houses may not require watering, provided cultivation has been given them up to the end of the year and then a good mulch put on. In such instances the vines are more healthy without water: there will be less chance of cracked berries. On the other hand, there are places where the soil gives up its moisture quickly. Such a condition may occur where the house is built on a dry clayey hill, shingly or sandy soil. In such cases water may be required to maintain a proper condition. It is best to make it clear, however, that where the supply of water cannot be depended upon it is preferable not to water at all rather than give conditions of drought and moisture. These remarks apply more particularly to the outside borders, because it is assumed that the vines are planted outside. With regard to the inside of the house, after allowing for a 3 ft. path, the remainder should be cultivated and a proper degree of moisture maintained. With an average rainfall of 40 in. per annum on 816 square feet, the square of the building, there would fall 16,951.3 gallons in the year. It is obvious if that is carried away from the eaves by the spouting some of it should be stored for using inside. Concrete tanks should therefore be made to store the rain-water. These tanks should be made with their tops level with the eave of the house. The water could then be applied to the borders by gravitation. A tank 8 ft. by 8 ft. and 5 ft. deep would contain nearly 2,000 gallons.

SYRINGING THE VINES.

Syringing the vines once a day in a coolhouse is sufficient. This should only be done on fine days. It is not necessary during dull or cold weather, and would then cause too great a check. The time of doing it should be not too late in the day—say, 3 o'clock, and never later than 5 o'clock in the summer. They have then time to dry before the cool of evening. Clean rain-water is the best for this. This is helpful in promoting a healthy growth when judiciously applied.

The 1913 International Congresses of Agriculture and Teaching of Household Economy will be held in connection with the Ghent Exhibition.

CHEESE.

EXAMINATIONS FOR MOISTURE AND FAT.

W. E. Gwillim.

A CONSIDERABLE number of samples of the factory cheese shipped at Wellington to the Home markets during the current dairy season were examined for the content of moisture and fat, and the results, together with some other particulars, are tabulated in three lists marked respectively "A," "B," and "C."

The samples examined were of 112 brands of cheese the produce of factories in Southland, Otago, Canterbury, Taranaki, and of factories regularly graded at the Port of Wellington. Samples of the latter were obtained at time of grading, and others as consignments were in course of transshipment at this port. The samples were all from cheese of the usual export size. In the tables the factory brands are represented by numbers.

The samples in lists A and B are from cheese of good body and texture which was about normal for acid, and were taken from the best-made cheese found in the individual lots exported by the respective factories. In list C the make was not so good, and the value of the body and texture is scored in points.

The samples were taken, as a rule, during two or three days prior to the day of sailing of the regular fortnightly steamer. In one or two instances, in list A, the cheese were shipped by some other steamer loading about the same time.

In the last two series of examinations the age of the cheese at the time of sampling is given.

The main objects of the examinations were to try to ascertain (1) to what extent the principal constituents of the cheese varied in the makes of the different factories, (2) whether the fat-content was in conformity with the legal standard, (3) and whether knowledge of the chief component parts of the cheese would have any useful influence in assisting the grader to a better understanding of the merits or otherwise of the body and texture at the time of grading.

The flavour of the cheese was not of a leading interest in these examinations, and was noted only in so far as the flavour due to acid was indicated by the character of the body and texture.

The content of moisture was ascertained by drying in a steam-jacketed oven, and the fat-content by the Babcock method. Exception may be taken to these methods, but there are good grounds for believing that the results obtained are good and accurate enough for all practical purposes, and generally are as correct as can be obtained by any other means.

Tabulated with the contents of moisture and fat are figures under the heading of "Casein and other Solids," representing the other solids which complete the cheese.

The legal standard for cheese made from whole milk is that "It shall contain in the water-free substance not less than 50 per cent. of fats wholly derived from milk." This requirement can be illustrated by taking the contents of the average cheese shown in list A and stating them thus:—

Moisture (water)	..	..	..	..	Per Cent. 36.85
Water-free substance—					Per Cent.
Fat	..	..	..	..	33.64
Casein and other solids		..	..		29.51
				----	63.15
					100.00

In this instance the percentage of fat in the water-free substance is 53.27.

In concluding these introductory remarks and before entering on a brief discussion of some points of interest in connection with the examinations, the average composition of Cheddar cheese as given by four different authorities may be shown as follows:—

Authority.	Cheese, Age, &c.	Moisture.	Fat.	Casein and other Solids.
		Per Cent.	Per Cent.	Per Cent.
American	Green	36.84	33.83	29.33
American	Cured	34.38	32.71	32.91
Canadian	Age not stated ..	34.00	36.00	30.00
English	Six months ..	33.92	33.15	32.93
English	Six months ..	31.17	33.68	35.15

LIST A.

Particulars of sixty samples of cheese examined for content of moisture and fat ex lots from ten factories in the Wairarapa and

Forty-mile Bush districts, exported by six fortnightly Home steamers—viz., “Remuera,” “Arawa,” “Ruahine,” “Tainui,” “Rotorua,” and “Ionic,” which sailed 17th October to 24th December, 1912, inclusive. One sample taken from each brand each fortnight. Body and texture about normal for acid; grading score under these headings, 28 points and over, out of a maximum of 30 points.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age and Notes at Sampling.	
				Days old.	Remarks on Body and Texture.
1.. ..	Per Cent. 38.0	Per Cent. 32.8	Per Cent. 29.2	..	Sweet side; green.
	37.0	32.8	30.2	..	
	37.9	31.2	30.9	..	
	37.2	32.8	30.0	..	
	35.8	32.8	31.4	21	
	37.1	33.6	29.3	28	
Average ..	37.17	32.67	30.16		
2.. ..	37.6	35.2	27.2	..	Rather weak. Could be firmer.
	36.8	35.2	28.0	..	
	37.8	32.0	30.2	..	
	37.6	32.0	30.4	..	
	38.0	32.4	29.6	26	
	36.8	33.6	29.6	15	
Average ..	37.43	33.40	29.17		
3.. ..	37.4	34.0	28.6	..	Silky, close.
	36.6	34.8	28.6	..	
	36.6	34.4	29.0	..	
	37.8	32.8	29.4	..	
	36.9	32.8	30.3	21	
	36.6	34.0	29.4	14	
Average ..	36.98	33.80	29.22		
4.. ..	37.1	35.2	27.7	..	Silky, close. Firm.
	35.4	34.4	30.2	..	
	36.9	33.2	29.9	..	
	36.1	34.0	29.9	..	
	36.0	32.0	32.0	23	Firm enough. Firm enough.
	35.0	34.0	31.0	17	
Average ..	36.08	33.80	30.12		
5.. ..	37.1	34.4	28.5	..	On green side Green. Green.
	37.0	34.0	29.0	..	
	36.8	33.6	29.6	..	
	38.2	32.4	29.4	..	
	37.2	32.8	30.0	12	
	38.2	32.0	29.8	10	
Average ..	37.41	33.20	29.39		

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age and Notes at Sampling.	
				Days old.	Remarks on Body and Texture.
6.. ..	Per Cent.	Per Cent.	Per Cent.		
	36.9	34.0	29.1	..	
	36.2	33.6	30.2	..	
	36.0	35.2	28.8	..	
	36.0	33.2	30.8	..	
	38.0	32.0	30.0	19	
	37.4	32.4	30.2	27	
Average ..	36.75	33.40	29.85		
7.. ..	36.8	35.2	28.0	..	
	37.4	35.2	27.4	..	
	36.8	35.2	28.0	..	
	36.6	33.2	30.2	..	
	36.4	33.2	30.4	29	
	37.2	34.0	28.8	21	
Average ..	36.87	34.33	28.80		
8.. ..	36.7	34.8	28.5	..	
	37.0	33.6	28.4	..	
	36.4	34.0	29.6	..	
	36.0	33.6	30.4	..	
	36.8	33.6	29.6	16	Green.
	36.0	34.0	30.0	18	
Average ..	36.48	33.93	29.59		
9.. ..	36.6	34.8	28.6	..	
	35.8	33.6	30.6	..	
	37.2	33.6	29.2	..	
	37.5	32.8	29.7	..	
	37.4	32.4	30.2	28	Good body and texture.
	37.7	33.2	29.1	31	Ditto.
Average ..	37.03	33.40	29.57		
10	36.4	36.0	27.6	..	
	35.4	36.8	27.8	..	
	36.9	33.6	28.5	..	
	36.0	34.0	30.0	..	
	36.0	33.2	30.8	20	
	36.8	33.6	29.6	20	
Average ..	36.25	34.53	29.22		
General average	36.85	33.64	29.51		

LIST B.

Particulars of 105 samples of cheese examined for content of moisture and fat ex lots from eighty-eight factories graded at grading-ports as stated and shipped by various Home steamers which sailed 17th October to 24th December, 1912, inclusive. Body and texture

about normal for acid. Grading score, 28 points and over out of a maximum of 30.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age and Notes at Sampling.	
				Days old.	Remarks on Body and Texture.

TESTED TO 1ST NOVEMBER.

Graded at Wellington.

	Per Cent.	Per Cent.	Per Cent.		
11	36.8	33.6	29.6	..	
12	37.4	32.0	30.6	..	
13	37.8	34.0	28.2	..	
14	37.6	32.0	30.4	..	
15	37.0	34.4	28.6	..	

Graded at Bluff.

16	36.4	35.2	28.4	..	
17	37.2	33.2	29.6	..	

Graded at Patea.

18	36.8	35.2	28.0	..	
19	36.4	35.2	28.4	..	
20	35.8	35.2	29.0	..	

TESTED TO 16TH NOVEMBER.

Graded at Wellington.

21	37.4	34.0	28.6	..	
22	36.6	34.8	28.6	31	
23	37.0	34.4	28.6	..	
15	35.6	34.4	30.0	..	
24	35.0	34.8	30.2	31	
25	35.6	34.4	30.0	..	
26	36.4	34.8	28.8	..	
27	35.3	35.6	29.1	..	
2	38.8	32.4	28.8	..	
2	38.0	32.4	29.6	..	

TESTED TO 22ND NOVEMBER.

Graded at Bluff and exported by s.s. "Kia Ora."

28	36.2	35.4	28.4	..	
29	35.4	34.8	29.8	..	
30	35.2	34.8	30.0	..	
31	35.8	33.6	30.6	..	
32	35.9	33.6	30.5	..	
33	37.3	32.8	29.9	..	
34	37.1	32.8	30.1	..	
34	36.4	33.2	30.4	..	
35	36.8	34.4	28.8	..	Silky, smooth.
36	36.6	33.6	29.8	..	
37	36.6	32.8	30.6	..	
38	36.6	32.8	30.6	..	
39	36.4	32.8	30.8	..	Green; shade acid.
17	36.2	34.4	29.4	..	
40	36.0	32.4	31.6	..	Silky, smooth.
41	36.0	34.4	29.2	..	
16	35.8	34.4	29.8	..	
42	35.5	34.0	30.5	..	Rather weak.
43	35.2	34.4	30.4	..	
44	35.1	34.4	30.5	..	
45	35.0	34.0	31.0	..	Lack of silkiness. Stiff body; close.
46	34.4	36.0	29.6	..	

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age and Notes at Sampling.	
				Days old.	Remarks on Body and Texture.

Graded at Dunedin and exported by s.s. "Kia Ora."

	Per Cent.	Per Cent.	Per Cent.	
47	36.4	33.6	30.0	..
48	36.2	33.2	30.6	..

TESTED TO 28TH NOVEMBER.

Graded at Wellington.

49	37.9	33.6	28.5	..	Green.
50	37.4	33.6	29.0	..	On green side.
51	37.4	32.8	29.8	..	
52	37.4	32.8	29.8	..	Silky, smooth.
53	37.2	33.6	29.2	..	On green side.
54	36.4	35.2	28.4	..	
55	36.4	33.2	30.4	..	
15	36.0	35.2	28.8	..	
56	35.9	33.6	30.5	..	On green side.
57	35.2	34.4	30.4	..	
58	35.7	36.0	28.3	..	On firm side.

Graded at Patea.

59	37.8	33.6	28.6	..
60	37.2	33.6	29.2	..
61	36.8	34.4	28.8	..
62	36.3	33.6	30.1	..

Graded at Lyttelton.

63	36.0	34.2	29.8	..
63	35.6	33.6	30.8	..

TESTED TO 11TH DECEMBER.

Graded at Wellington.

15	35.2	33.6	31.2	16	
50	36.0	30.4	33.6	24	
13	36.4	32.8	30.8	23	
53	37.0	33.2	29.8	21	
27	33.4	34.8	31.8	15	Green ; little stiff.
22	35.0	33.6	31.4	29	Silky, smooth.
9	37.2	32.8	30.0	25	
64	36.2	33.6	30.2	29	
65	34.8	34.4	30.8	17	On green side.
66	36.7	33.6	29.7	23	
67	36.0	33.6	30.4	20	Firm enough.
68	35.9	33.6	30.5	25	
69	34.1	35.2	30.7	21	
14	38.0	30.8	31.2	24	Silky.

Graded at Patea.

60	38.4	32.8	28.8	18	Rather weak.
70	38.0	33.6	28.4	21	Rather weak.
71	38.6	32.8	28.6	21	Rather weak.
72	38.4	32.0	29.6	25	Rather weak.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age and Notes at Sampling.	
				Days old.	Remarks on Body and Texture.

TESTED TO 24TH DECEMBER.

Graded at Wellington.

	Per Cent.	Per Cent.	Per Cent.		
1	36.8	32.4	30.8	17	
73	36.0	33.2	30.8	25	
26	37.2	33.2	29.6	25	
9	36.9	32.8	30.3	33	
56	34.6	33.6	31.8	20	
74	35.0	34.0	31.0	16	Green.
75	36.0	33.6	30.4	19	
50	34.6	34.0	31.4	22	Silky, smooth.
50	34.4	36.0	29.6	22	Silky, smooth.
50	35.0	34.0	31.0	18	
13	35.6	34.4	30.0	21	

Graded at Patea.

76	33.6	36.8	29.6	20	Silky, smooth. close.
77	34.8	34.0	31.2	17	
78	37.9	32.4	29.7	20	Could be firmer.
79	36.9	33.2	29.9	28	
80	36.4	32.4	31.2	26	
81	36.5	34.4	29.1	23	

Graded at New Plymouth.

82	35.4	32.8	31.8	28	
83	35.4	36.0	28.6	26	Silky, smooth.
84	36.8	32.8	30.4	25	Could be firmer.
85	36.0	36.0	28.0	25	Silky, smooth.
86	37.3	32.8	29.9	20	Silky, close.
87	36.1	33.2	30.7	32	

Graded at Bluff.

17	36.2	34.0	29.8	33	Silky, smooth.
29	36.4	33.6	30.0	35	Silky, smooth.
88	36.6	33.2	30.2	27	Silky, smooth.

SUMMARY OF AVERAGES.

Grading-port.			Number of Samples.	Moisture.	Fat.	Casein and other Solids.
				Per Cent.	Per Cent.	Per Cent.
Wellington..	..	..	51	36.26	33.71	30.03
Bluff ..	..	..	27	36.12	33.88	30.00
Dunedin ..	..	..	2	36.30	33.40	30.30
Lyttelton ..	..	..	2	35.80	33.90	30.30
Patea ..	..	..	17	36.86	33.84	29.30
New Plymouth ..	..	..	6	36.17	33.93	29.90
General average ..			..	36.25	33.78	29.97

(To be continued.)

SEMI-OFFICIAL TESTING.

W. M. SINGLETON.

THE semi-official testing of purebred dairy cows by the Dairy-produce Division has been well supported for this, its first season. With the general extension of association cow-testing among ordinary milking-herds the demand for purebred bulls of good milking-strain has become accentuated, and to enable breeders to place authentic records before intending purchasers the obtaining of semi-official yearly records became a necessity.

Every effort has been made to place these records above suspicion, and breeders have met the Division very heartily in this respect. The Holstein-Friesian and Jersey breeders have adopted the system, and there are now entered in test for semi-official certificate 123 Holsteins and 106 Jerseys. A number have been entered and have been withdrawn from competing for certificate, owing to their not meeting the requirement of having dropped a calf within fifteen months previous to the commencement of the test. For this first season a number of these cows are being tested, and the owners will be given a signed statement of the cows' production, but no semi-official certificate will be available, neither can their names be included in the list of cows having qualified. In all, over two hundred and fifty cows are in yearly test; their daily weights of milk being recorded by the owners and checked by the officers of the Dairy-produce Division, who also make the monthly fat-determinations.

The milking-herds of the experimental farms are being submitted to the same checking and testing by this Division as are other purebred cows under semi-official test. With these the total number of cows under this yearly test will this season exceed three hundred. The figures obtained will be of great benefit to all concerned, and especially to the dairy-farmer seeking to purchase a purebred bull with a performance pedigree. It will also benefit the breeders, for a dairyman does not object to paying more for an animal backed by a good authentic yearly butter-fat record.

In Denmark a bull is regarded as useless for breeding purposes if he does not possess a milking pedigree, both on the side of the dam and of the sire, for generations back.

SYNTHETIC MILK.

THERE was published in the last issue of the *Journal* a report on synthetic milk—the new artificial substitute of milk made from vegetable products, the discovery of three German scientists—from Mr. Walter Wright, the New Zealand Inspector of Dairy-produce in London. Further particulars of the commercially prepared rival of cow's milk are now to hand from Mr. Wright, who reports,—

Mr. A. J. Faulding, of 265 Strand, produced various edible substances derived from synthetic milk, or from the materials of which synthetic milk is composed, and gave some further information regarding this wonderful product, which it is said is an efficient substitute not only for cow's milk, but for various other nutrients. He produced a certificate from Messrs. Harrison and Self, the well-known analytical chemists, of 55 Chancery Lane. The following is the comparative analysis between standard cow's milk of exceptional rich quality, and it is far better than the milk which comes up to the requirements of the Board of Agriculture :—

<i>Synthetic Milk.</i>				<i>Cow's Milk.</i>			
Proteins	..	..	3.70	Proteins	..	..	3.30
Fat ..	..	..	3.97	Fat ..	..	..	3.60
Sugar ..	..	..	3.78	Sugar..	..	..	4.80
Mineral matter	..	..	0.79	Mineral matter	..	..	0.73
Water..	..	..	87.84	Water	..	..	87.60

The composition is thus very closely similar to that of rich cow's milk. The fat is in a very fine state of division, microscopical examination showing that the particles are considerably smaller than the particles of fat in cow's milk ; this will conduce greatly to easy assimilation. The phosphorus exists entirely in the form of organic compounds, and is therefore capable of being utilized to the full when the milk is taken as food.

Among the exhibits displayed by Mr. Faulding the following are noteworthy : Cream for cooking or ice-cream in paste form ; a substitute for meat which may be roasted or boiled, and is said to possess more than twice the nourishment of beef, and which can be produced and sold at half the cost of good fresh meat. These products are very palatable. Some samples of a substitute for macaroni were shown, and these are said to be far richer than macaroni and quite suitable for consumption without any addition of meat or cheese.

Mr. Faulding also explained that the arrangements for the first factory are nearly complete, and the premises are about to be taken in London for the first plant suitable for the manufacture of not less than 40,000 quarts of milk per day. These premises will only supply a one-twenty-fifth part of the requirements in London, and a London company for the laying-down of plants in various parts is about to be formed, the parent syndicate being practically completed. Applications for licenses to work the process are being received from all parts of the country.

There are in England and Wales more than a thousand co-operative societies for the mutual insurance of pigs.—*Journal of the British Board of Agriculture.*

FRUIT-CANNING.

THE importance of being in a position to profitably dispose of fresh fruit in times of congestion of supplies—to relieve fresh-fruit markets and thereby maintain values—and of meeting the steadily increasing demand for canned or preserved fruit, makes the establishment of canning-factories a necessity. The value of the bottled and tinned fruit imported into the Dominion last year was £42,873, whilst fruit-pulp to the value, roughly, of £2,000 was also imported. Fruit-canning is not only an excellent means of maintaining payable prices for the crop, but can be made a stable business ensuring remunerative values. The canning, however, must be conducted on proper principles. The first essential is a proper and well-equipped building. Hence the publication of the following plans and specifications, prepared by Mr. R. B. Grange, M.I.M.E., Consulting Engineer, of Wellington. In submitting the plans, Mr. Grange writes, "The specifications clearly set forth the details of the buildings and also of the plant. The prices are attached to the latter, but as an estimate for the erection of the buildings as per specification it is calculated to cost about £2,000, built entirely in wood. If the engine-room, tinsmith's shop, and can-store are to be built in brick it will cost about £150 extra. In the writer's opinion the extra cost will be amply repaid, inasmuch as the insurance on the buildings would be materially reduced and in a very short time would more than repay the extra expenditure."

SPECIFICATION OF LABOUR AND MATERIAL REQUIRED IN THE ERECTION AND COMPLETION OF A SMALL FRUIT-CANNERY.

Excavation.—Excavate trenches for foundations, piles, &c., as shown on drawings, or deeper should same be necessary to secure a good solid bottom; also for all drains from W.C.s, &c. Retain the best of the material excavated, and ram well round foundations and piles as the work proceeds.

Concrete.—All concrete footings, sills, &c., to be composed of five parts clean aggregate and one part of best approved cement, mixed dry and turned over twice dry, carefully wetted from a rose, and again turned over twice before throwing into trenches or other parts. Footings, &c., sizes as shown. All concrete to be measured in proper gauge-boxes and properly mixed on approved mixing-boards. All cement must be in the best possible condition. Stones to be not larger than will pass a 2-in.-diameter ring, with the smaller stone left in, mixed with sufficient sand to completely fill the voids between stones. Concrete in floors to be composed of four parts clean shingle and sand and one part approved Portland cement as above. Shingle in floors to pass a 1-in.-diameter ring. Concrete floors to be finished with $\frac{3}{4}$ in. of cement and sand in equal proportions, trowelled smooth.

Urinals to be formed as shown with brick on edge; partitions, corners, and angles to be rounded off, and channel sloped to gully. The walls round same to a height of

3 ft. 6 in. to be built up in brick, and the whole plastered with cement and sand, equal parts, finished with a layer of neat cement. Floor as shown to be of concrete, rendered as specified, laid to fall to channel.

Filling.—Fill in with approved material under all concrete floors, care being taken that all filling is well rammed and consolidated.

Boxing.—Supply and fix all necessary boxing for concrete of sufficient strength for the various requirements.

Damp-course.—Provide and lay two-ply Malthoid or other approved damp-course on all brick walls below concrete floor, and under bottom-plate level, painted on both sides with P. and B. paint properly bedded. All laps to be wide and well cemented.

Brickwork.—All bricks to be sound, well burned, wire-cut, of approved quality; to be laid in hydraulic-lime mortar, one-third lime and two-thirds clean, sharp sand, free from loam or vegetable matter. Work to be carried out in a bond of three courses of stretchers and one course of headers, with Ajax or other approved brick bonding, equal to one strand to each 4 in. thickness of wall and every eight courses in height, commencing four courses above damp-course. Also lay similar bonding under all sills and over openings. All joints in brickwork to be neatly struck inside. All bricks to be thoroughly wetted before being laid. Build in concrete pads, four courses thick, 2 ft. long under all beams. Build in coke-breeze bricks where necessary or as directed.

Arches.—Turn arches over all window and door openings in three rings of brick. Build out or recede for all offsets for plates, &c., and bed all plates and other timbers that may be necessary.

Grouting.—Grout well and make solid all brickwork at every course with liquid hydraulic-lime mortar. Build in all anchors, wall-plates, bolts, &c., as shown or necessary.

Plastering.—Cement-plaster all external exposed brickwork in two coats of cement, finished not less than $\frac{3}{4}$ in. thick, two parts sand and one of cement, and neatly finished off with cement and sand, one to one.

Door-rails.—Provide and fix 14-lb.-per-yard steel rails as shown on plans.

CARPENTER AND JOINER.

All carpenters' and joiners' work to be of the best description, and executed in a thoroughly workmanlike manner, including all necessary mortising, tenoning, halving, pinning, scarfing, centring, housing, and other requisite work. All timbers to be of the best description of their respective kinds, sound and dry, free from large or loose knots or other imperfections, to be cut die-square, and to hold full sizes specified, and figured when finished.

Roofs.—Construct roofs as shown on detail and plans, and of the dimensions thereon. Form box gutters as shown, the sides or bearers to be 2 in. thick, and bottom 1 in. to rest on, and secured to fillets nailed to sides laid to fall. Purlins 6 in. by 2 in.; each alternate purlin where abutting brickwork to be strapped at ends and anchored to same.

Skylights to have Hope's or other approved glazing-bars spaced not more than 2 ft. centres, as per plans. All roof-timbers to be Oregon or heart rimu. Skylights over engine-room, can-store, and tinsmith's shop to be Wade's patent skylight of the sizes shown.

Floor-timbers, &c.—Sleeper-blocks to be 8 in. by 8 in., let 18 in. into solid ground, heart totara or jarrah, spaced as shown on plans.

Sleepers and stringers to be 6 in. by 3 in. by 6 in. by 2 in. respectively, heart totara or jarrah.

Bottom plates to be 6 in. by 3 in. heart totara or jarrah.

Floor-joists to be heart rimu, 6 in. by 2 in., at 18 in. centres.

Flooring.—Cover the whole of the interior floors (coloured yellow on plans) with 6 in. by 1 in. T. and G. heart matai, double-nailed at each joist, closely cramped; boards to be in as long lengths as possible, and butt joints scattered.

Barge-boards, gutter-fascias, and cover-boards to be 8 in. by 1½ in., with cavetto under cover-piece, all of dressed totara.

Partitions.—Studs 5 in. by 2 in., at 18 in. centres, opening studs 5 in. by 3 in. Posts under principals in partitions 5 in. by 5 in., top plate 5 in. by 2 in., all diagonally braced at all available spaces with 4 in. by 2 in. solid bracing. Studs let into plates ½ in., all securely spiked. All heart rimu.

Lining.—Line all wooden partitions and walls not otherwise specified on the inside with 6 in. by 1 in. T. and G. wrought rimu lining, closely fitted and well nailed. Line the walls and ceilings of offices, walls of ladies' dressing-room, lavatories, and W.C.s

with 6 in. by $\frac{1}{2}$ in. T.G. and V-jointed heart-rimu boards, closely cramped and double-nailed.

Stops and facings to be 6 in. by 1 in. heart totara.

Windows.—Window-frames in offices, ladies' dressing-room, W.C.s, and urinals to be of heart totara of the ordinary pulley-frame type. Sills to be double-sunk, 3 in. thick; styles and heads to be 1 in.; all framed and fitted together with 2 in. heart-totara bars and sashes as shown. All sashes to be hung with best sash-cords running through brass-faced axle-pulleys. Windows to have finger-lifts and fasteners, value 2s. per window. Combined louvres and windows to be fixed in all apartments as shown, both to be fixed, also continuous louvres in centre bays between principals of roof over processing and preserving room. Louvres to be 1 in. dressed totara, grooved into 6 in. by 3 in. studs $\frac{1}{4}$ in. Studs to be at 2 ft. centres. Window and louver frames to be 5 in. by 3 in., with 3 in. weathered and throated sills.

Wrought-iron window-frames.—Provide and fix wrought-iron window-frames, &c., as shown, in tinsmith's shop, can-store, and engine-room. Section of bar, about $1\frac{1}{4}$ in. by 1 in. Portion to be made to open as shown on plans, fitted with approved opener, &c.

Doors.—All external sliding-doors to be 2 in. thick, framed, ledged, and braced; doors clad on the outside with T. and G. and V 6 in. by 1 in. boards carefully cramped and double-nailed at each bearing; all to be of totara. Doors to be provided with all the necessary antifriction rollers, runners, stops, guides, &c., and to be secured with stout approved galvanized iron hasp staples and padlocks fitted with three keys to each lock. All internal sliding-doors to be 2 in. thick, as above, of heart rimu. Doors where shown on plans to be fireproof according to the requirements of the Fire Underwriters' Association. All external hung doors to be 2 in. by 6 ft. 10 in. by 2 ft. 10 in., framed, ledged, and braced, hung with three 4 in. cast butt hinges to 2 in. rebated jambs, and fitted with furniture to the value of 6s. per door, all heart totara. W.C. doors and doors in ladies' dressing-room to be $1\frac{1}{2}$ in. thick, framed, ledged, and braced, &c., as above, of heart rimu.

Verandahs.—The verandahs to be constructed of totara as shown, with 6 in. by 6 in. posts, 4 in. by 4 in. brackets, 8 in. by 6 in. top rail, 5 in. by 2 in. rafters, &c., as shown on plans. Form steps as shown with 2 in. strings, $1\frac{1}{2}$ in. treads. Front edge of verandah to be rounded off with small cavetto under.

Architraves to be 5 in. by $\frac{7}{8}$ in. plain heart rimu.

Lavatory basins to have 1 in. kauri tops supported on suitable framework.

Nosings.—Put to all windows so requiring $1\frac{1}{4}$ in. rounded nosings, returned at ends.

Cover all roofs, except where glazed, with 24-gauge galvanized corrugated iron (approved brand), secured with $2\frac{1}{2}$ in. lead-headed nails at alternate corrugations. Sheets to lap 8 in. on horizontal and two corrugations on vertical joints.

Outside covering for walls.—Cover all walls so requiring on outside with 24-gauge iron as above, to lap 8 in. on vertical joints, and two corrugations horizontal joints.

Ridges and hips.—All ridging and hips to be covered with 24-gauge iron, not less than 20 in. girth.

Flashings.—All flashings to be 5 lb. lead, thoroughly dressed into corrugations, and where abutting brickwork to be stepped, to go 1 in. into brickwork, metal-keyed, and cement-pointed.

Gutters.—Gutters as shown to be lined with 24-gauge galvanized iron having not less than 6 in. lap at joints, which shall be double-riveted and double-soldered and laid with proper falls.

Downpipes, &c.—Properly framed and boxed hoppers to be made where required, lined and dressed with 6 lb. lead, allowing for the rain-water to be taken away where required or as decided. Flashing at apex on top of skylights to be carried well up, bent over, and turned down, to prevent drift. Downpipes, twelve in number, to be 4 in. diameter, 24-gauge galvanized iron, secured with approved holdfasts, and provided with necessary lead swan-necks from spoutings. Cast-iron shoes to all downpipes.

Wash-basins.—Supply and fix in positions shown enamelled lavatory basins, value 15s. each, fitted with brass chains, brass plugs, and washers, &c., complete, and fix over same $\frac{1}{2}$ in. H.P. brass taps.

W.C.s, &c.—Provide and fix as shown W.C.s, with all necessary approved flushing-cisterns, 3 gallons each: pedestal pans (approved), with hinged seats; all connected to drains, and provided with the necessary Buchan trap, sewer-vent and terminal ditto. Drainpipes of best socketed and glazed earthenware, cement-jointed, and provided with the necessary cleaning-eyes, and all laid to proper falls.

Spouting.—Spouting to be 5 in. ogee, put up with patent galvanized-wire clip brackets at every 3 ft. apart.

Water-supply.—Connect with $\frac{1}{2}$ in. galvanized-iron piping to all lavatory basins and cisterns.

Waste-pipes.—All lavatory-basins to be properly 2 in. lead-trapped; wastes taken out to gully-traps with 2 in. galvanized-iron water-pipes.

Cistern, &c., over urinal.—Fix over urinal an approved 3-gallon flush cistern, with stout brass chain and porcelain pull and the necessary copper ball, tap, &c. Connect same to urinals with $\frac{3}{4}$ in. galvanized-iron piping. Piping round urinals to be perforated.

Ventilators to be Turner's Incessant or other approved type.

PAINTER AND GLAZIER.

Paint all external woodwork and doors four coats, including priming coat, best Hubcock's or Champion's white-lead in oil in approved tints. Paint all joinery work four coats.

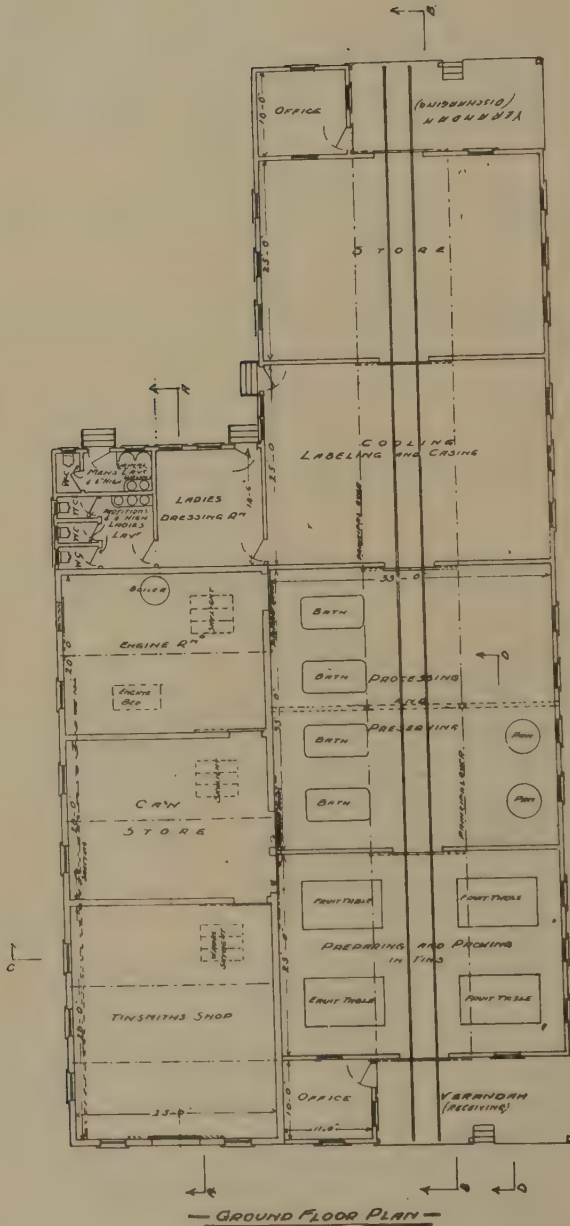
Glazing.—Roof-lights and skylights to be glazed with Hartley's patent rough plate glass. Windows to be glazed with 16 oz. British sheet glass, carefully sprigged and putted.

SPECIFICATION FOR MACHINERY REQUIRED FOR CANNERY CAPABLE OF TURNING OUT 4,000 CANS PER DAY, IN 2 LB., 4 LB., AND 6 LB. SIZES.

Most of the machinery is of Australian manufacture, and the freights will have to be added to the appended list to whatever seaport is nearest from Sydney.

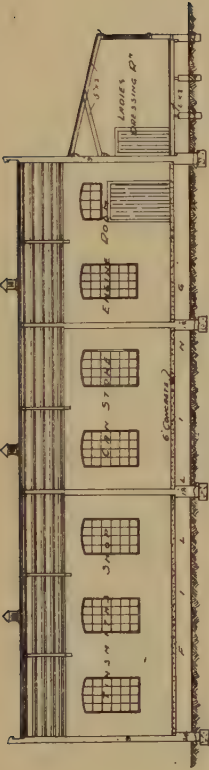
	£	s.	d.
1 No. 1 inclinable power press for stamping the caps	35	0	0
1 No. 2 inclinable power press for stamping the tops and bottom ..	48	0	0
1 22 in. treadle guillotine shear	17	0	0
1 No. 1 power curving-rollers	8	10	0
1 No. 2 vertical double-headed crimper, with heads for 2 lb. cans ..	22	0	0
Extra pair of heads each for 4 lb. and 6 lb. cans, at £1 per pair ..	2	0	0
1 complete set of dies for stamping tops, bottoms, and caps of 2 lb. tins ..	8	10	0
1 complete set of dies for stamping tops, bottoms, and caps of 4 lb. tins ..	10	0	0
1 complete set of dies for stamping tops, bottoms, and caps of 6 lb. tins ..	12	10	0
1 six-head capping-machine	25	0	0
1 solder cylinder, treadle, and stand for 2 lb. tins	3	0	0
1 solder cylinder, treadle, and stand for 4 lb. tins	3	0	0
1 solder cylinder, treadle, and stand for 6 lb. tins	3	0	0
1 power air-compressor	16	0	0
1 air-reservoir tank, with safety-valve	3	10	0
2 gas-fire pots for solder-iron heating, at £3 10s. each	7	0	0
2 gas-heating stands to take rotary jokers, at £3 10s. each	7	0	0
2 rotary jokers, each fitted with heads for 2 lb. cans, at £3 15s. each ..	7	10	0
Extra heads for 4 lb. and 6 lb. cans, 12s. per set	2	8	0
2 cooling-baths	20	0	0
1 testing plant, single tins	25	0	0
1 12 h.p. oil-engine	150	0	0
1 12 h.p. vertical boiler complete	90	0	0
4 processing-baths	56	0	0
2 100 lb. steam jacketed boilers	70	0	0
4 processing-crates	10	0	0
2 apple-parers, "Power"	8	0	0
Pitting-machines, knives, scales, scoops, skimmers, thermometers, tubs, &c. ..	15	0	0
Shafting, pulleys, belting, &c.	80	0	0
Pulley-blocks and overhead traveller	15	0	0
Tramway and trolley	20	0	0
Erection and fitting up	60	0	0
Office furniture and safe	40	0	0

WORKING-PLAN OF SMALL FRUIT-CANNERY.

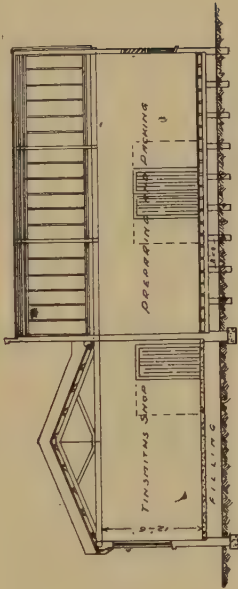


Scale 24 feet = 1 inch.

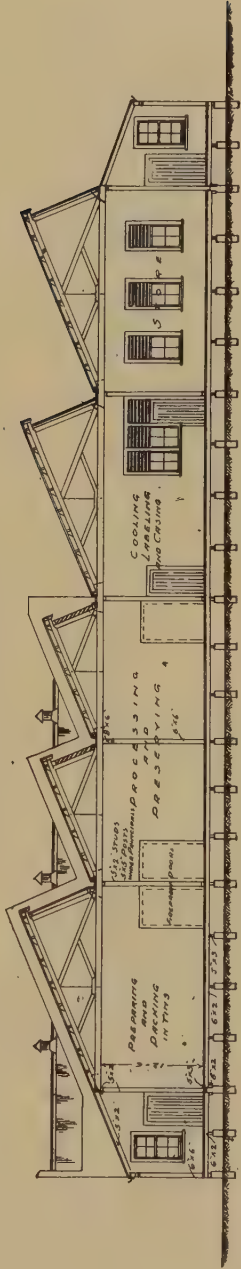
— GROUND FLOOR PLAN —



—SECTION A.A.—

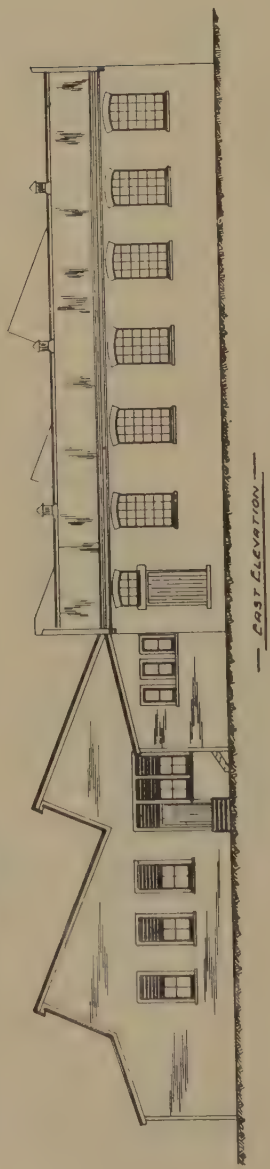


—SECTION C.C.—



—LONGITUDINAL SECTION B.B.—

Scale: 24 feet = 1 inch.



Scale : 24 feet = 1 inch.

THE HEMP INDUSTRY.

W. H. FERRIS.

ALTHOUGH a considerable increase has taken place in the amount of phormium milled throughout the Dominion, the average quality is unsatisfactory. This is not entirely due to bad milling, but is more the result, particularly in the Manawatu, of the high percentage of diseased leaf in the swamps. This quite prevents the miller, even where every care is taken in the milling process, turning out anything above a high-point fair grade. A heavy loss is thus occasioned to some millers not only by reason of their having to be content with a lower grade, but owing to the fact that they are thus unable to fulfil good-fair contracts entered into when market values were at their maximum.

Generally there is little to complain about in regard to the way the hemp is being milled, except in the case of mills which have been recommissioned this season in the Auckland District. Herein is to be seen the drawback to high market values. It will pay millers with present prices to turn out a fair-grade article, whereas with a market like that of last season the milling of good-fair alone was profitable.

Westland and Marlborough millers are turning out an excellent-quality hemp. They have a good healthy leaf to work with, and are milling it to advantage. High-pointed good-fair and fine is being turned out by the majority of millers. Southland millers have also a good-conditioned leaf to work with, but are aiming at high-pointed fair to meet contracts. The Southland leaf is of a short, stiff nature, the fibre being strong but on the short side, and this want of length is the chief weakness in the fibre coming forward for shipment from that quarter. Altogether sixty mills are in operation in Otago this year, against about fifteen which operated last season.

The big increase apparent in the output of hemp from the different districts of the Dominion does not represent the maximum production of this season, as a considerable development in milling operations is expected to take place this month, a number of new mills being now ready to commence operations.

Tow is coming to hand in only a fair condition. Although there is a good demand for it at a very payable price, many millers are not taking the care in the preparation of this by-product they should, while in other cases the poorer quality coming forward is due to the inferior leaf with which millers, particularly in the Manawatu, have to work.

THE APIARY.

NOTES FOR FEBRUARY.

F. A. JACOBSEN.

THE severity of the spring from a beekeeper's point of view has been a factor to be reckoned with in £s.d., for the honey crop will not in consequence be so large as in some former years. The quality, however, may prove to be excellent, while the yield per colony will probably be good.

The loss in the diminution of colonies, owing to depleted stores of nectar, will, however, be difficult now to overcome. The weather visitation has been general throughout the Dominion. The individual loss will be, however, by no means uniform. It is in such a season as the present when the careful beekeeper, who manages his apiary to the best advantage, will reap the greatest reward from his special knowledge and diligence. The slipshod beekeeper will always be the heaviest loser.

VALUE OF BEES ON THE FARM.

The average farmer rarely attaches the importance to his bees that he should, yet their value as fertilizing agents is very great. Did he appreciate the possibilities in beekeeping as a side line to his farming operations, he could, by the exercise of a little care and thought, make them a good source of revenue. Many a farmer's wife has found a few hives an important means of providing the home with groceries and adding to the pleasure of the table. Instead of leaving the calm, clean, and healthy environment of the country for a city office or factory the daughter of the farmer would probably find it better for body and soul to take up beekeeping, one of the most entrancing occupations when properly studied and carried out.

ROBBER BEES.

The compensation for time and labour spent with the bees for the past twelve months will be the quantity and quality of honey gathered at the harvest. The process of extracting the honey is a pleasurable one, and usually puts the beekeeper in his best humour. As with all things, there is an exception to this rule, as sometimes the reverse is the case, on account of robbing having commenced during the process of manipulation of colonies in bad weather, or, in other words, during a dearth of nectar. When this is so it is necessary to proceed with

great caution. The entrance to any hive that other bees are robbing should be contracted, so that only a few may enter at a time, then the defenders can take and eject any inquisitive intruders; whereas with a broad entrance it takes a large force to keep effective guard. Weak stocks are generally pirated by these unscrupulous brigands in the bee world. The bees become exceedingly savage, and large numbers will be noticed flying at the entrances of a few hives, and with the fighting in progress on the alighting-boards it is not possible for even a novice to be mistaken. Work in the apiary should be abandoned until everything is quiet, otherwise the trouble will commence again, and at the same time the bees will viciously attack the apiarist. Guard against robbing by extracting before the honey-flow is quite finished, and so make the work what it is intended to be—a pleasure.

TO REMOVE FULL SUPERS.

Presuming that extracting is to be done under favourable conditions, it will not be necessary to use much smoke. The combs of sealed honey should be removed from the super, and the bees brushed off them as quickly as possible before taking them to the honey-house. It is a good method to have an empty body-box on a barrow alongside the hive, and as the bees are brushed off the combs from the full super they are placed in this empty one, which is immediately covered over, to prevent any robber bees getting into it.

When sufficient supers of combs have been accumulated in the honey-house to occupy the remainder of the day in uncapping and extracting, these operations are next proceeded with.

UNCAPPING.

Two Bingham knives are required for uncapping the sealed combs, and these must be kept in almost boiling water, and used alternately. Keep the edges well sharpened to expedite the work. Lean a comb on the pivot above the uncapping-can, and commence slicing off the wax caps from the bottom, holding the comb towards the knife, to allow the pieces to fall clear into the can. Now swing the comb round on the pivot and do the other side in a like manner before placing the comb in the extractor. Fill the baskets of the machine, putting only one comb in each basket, and, after turning the handle to revolve the baskets for a couple of minutes, reverse them by a lever that is attached, and turn again for the same period, when the combs can be taken out empty and fresh ones put in their place. Care must be taken not to turn too quickly when working on new combs, as these are likely to smash. The honey is run off into tanks, and the cappings treated as explained in previous issues of the *Journal*.

ORCHARD WORK FOR FEBRUARY.

W. A. BOUCHER.

CULTIVATION.

OCCASIONALLY one sees orchards of young trees where the cultivation of the soil has been entirely neglected. It is a great mistake to suppose because the trees have not commenced to bear that the labour and expense of keeping the soil free from growth of weeds and grass is not justified. During the warm dry months of summer clean cultivation of the soil is absolutely essential in order that the trees may have the full benefit of the moisture in the soil; in the case of young trees to develop their growth, and in the case of older trees to develop both growth and crops.

CODLIN-MOTH.

Spraying for this pest will no longer be necessary in the case of some of the earlier ripening varieties of apples, but the vigilance of the orchardist must not be relaxed to prevent infection of later-ripening varieties. In most districts of the Dominion a fairly heavy flight of moths is usual about the middle of February. In spite of all previous efforts to keep the moth under control, if the fruit is not protected by a coating of arsenate of lead, in anticipation of this flight, a more or less considerable percentage of loss by infection may still be experienced.

BITTER-ROT OF THE APPLE (*Glommorella rufomaculans*).

In districts where humid climatic conditions have been experienced during the month of February considerable losses of some varieties of apples have been occasioned owing to attack by this fungus. Unlike apple-scab, or "black-spot" as it is sometimes called, which attacks the fruit in the early part of the season, bitter-rot will hardly be noticed until the fruit has commenced to ripen. Development then is rapid, and no time must be lost in taking the necessary measures for control by spraying with the Bordeaux mixture, 4-5-50 formula.

LEECH.

With the continuance of warm weather this pest will still find ample opportunity for doing a considerable amount of injury to the foliage of pear, cherry, and plum trees unless the leaves have been well protected against attack by spraying with arsenate of lead. Serious injury to foliage even late in the season will affect the vitality of the trees during the following season.

TOMATO - CULTURE.

W. A. BOUCHER.

COMPLAINTS have been received from many tomato-growers of want of success in keeping their plants free from disease, unsatisfactory crops being the natural result. It is a common mistake to overlook the fact that the tomato is naturally a gross feeder. To apply to such a plant the conditions frequently found in a tomato-house—a free well-drained soil heavily manured, frequent and heavy watering, together with excessive heat—only tends to produce rank, sappy growth and large, tender foliage. Susceptibility to disease is often promoted by the early forcing of the plants, which are overcrowded in the propagation-boxes, with the result that they become drawn up and weak, instead of being stocky and strong. These plants are then set out in soil that has been overmanured. Many growers seem to be under the impression that the soil should be well manured before the plants are set out, and, in applying the manurial treatment to the small area contained in a tomato-house, they are altogether too liberal. Where the quantities of manures applied to some houses have been worked out at the rate per square yard, it has been found that the amounts have been so large as to be actually injurious to the plants rather than beneficial. Instead of the manure being carefully proportioned per square yard of the area under cultivation, the manure, possibly on account of the very smallness of the area, is not unfrequently measured out by the bucket, and accordingly applied entirely by guesswork. This too-liberal treatment of the soil is frequently followed by heavy watering combined with excessive heat, producing unnatural conditions which tend to lower instead of increase the vitality of the plants. The general result, then, is much increased susceptibility to various diseases.

Better results would often be derived by raising and planting out only sturdy, stocky plants in soil that is not too rich, and applying the manure after the plants have commenced to blossom and at intervals during the season; by reducing the quantity of water and increase the cultivation of the soil; by keeping down the heat with plenty of top ventilation; and by, as far as possible, avoiding the use of stable manure as a mulch. With regard to this last condition, cultivation of the soil is much to be preferred to any mulch of decaying vegetable matter that may be used as a means of retaining the moisture in the soil. Decaying vegetable matter in a tomato-house may be regarded as distinctly contributing to the difficulty of keeping fungus diseases well under control.

VINEYARD WORK FOR FEBRUARY.

S. F. ANDERSON.

EUROPEAN VINES ON ESPALIER FENCES.

THE growth of the vines this month is very strong, and the principal work is the moderate suppression of the fruit-bearing shoots growing up from the horizontally extended rod, and the training and tying of the strong canes growing from the stem along the top wire. The pinching or stopping of the first should not be done until they nearly reach the top of the espalier fences. It is a good plan to have the second wire from the bottom duplicated—that is, two wires at that place about 4 in. to 6 in. apart. Where ordinary fencing-posts are used to carry the wires a wire strained at the same height on each side of the posts provides the right space. Then, before they get too long the fruit-bearing shoots can be tucked up between these wires, and are thus kept in their place. This saves a lot of tying. Regarding the training of four strong upright shoots or canes from the stem, these are to provide two rods for tying along the bottom wire in the winter and to bear the fruit for the following season, and two to be cut back for spurs. At the present time, however, these are allowed unrestricted growth, and are trained along the top wire until pruning-time, merely seeing that they do not branch out by pinching in their side shoots.

If the season is fairly warm and dry there will not be much danger from black-spot and mildew. On the other hand, if moist close weather prevails, a spraying of Bordeaux mixture for black-spot and a further sulphuring for mildew may be necessary.

Keep the ground well cultivated, as this brings on the fruit. The radiated heat from cultivated soil increases the sugar in the grapes—a very important matter where the grapes are intended for wine-making. The earlier-ripening grapes such as the Golden Chasselas will be coming on towards the end of the month and will require to be protected from the birds.

TREATMENT OF THE ALBANY SURPRISE, ISABELLA, AND OTHER AMERICAN GRAPE-VINES.

These differ from the European varieties of vines in that they will not stand the control of their summer growth to the same degree. They therefore require as much room as an ordinary orchard-tree.

Just the amount of restraint of their summer growth without permanently affecting their vigour has not yet been clearly demonstrated, but wherever they have been subjected to the same treatment as the European the result has been a falling-away. Growing them in a circle, with the main branches radiating from the centre and kept off the ground by forked sticks, is the best that can be suggested. Bulletin No. 11 (new series) describes the culture best adapted to these vines. Although practically immune from mildew they are subject to black-spot, though in a less degree than the European vines.

WORK IN THE VINE-HOUSE FOR FEBRUARY.

S. F. ANDERSON.

IN most of the cool vine-houses in the northern parts of the Dominion Black Hamburg and Foster's Seedling will now be ripe, and will require to be kept dry until gathered. Plenty of fresh air may now be admitted through top and bottom ventilators and doors. All openings should have protection by wire netting of small mesh to keep out the blackbirds and thrushes. A lot of damage may be done to a fine crop in a very short time by neglect of this.

It is at this stage of grape-growing where the advantage of growing vines that ripen their fruit about the same time is manifest. In a house where Gros Colman and Black Hamburg are grown together the first is not nearly ripe: it is, in fact, just at the stage when it requires most heat, while the latter should have the conditions of a cool, dry house.

As soon as the fruit from the early-ripening vines has been gathered give them an occasional syringing to keep red spider down, and cultivate the borders to assist late growth. Do no more pinching now, but let the vine have full liberty of growth until the leaves begin to fall.

With the late grapes—Gros Colman, Alicante, Golden Queen, and others—cracking of the berries sometimes occurs. This is caused by an unequal supply of moisture, which cannot always be controlled by the grower, heavy rains after a spell of dry weather being often the cause. The best preventive, however, is well-made, thoroughly drained borders, and the control of an ample water-supply. This will afford the best means of regulating the moisture of the borders.

A heavy fall of rain will not then affect them so much, and the best condition will be maintained during dry weather.

Shanking, a more obscure disease than the cracking of berries, is also a greater trouble with late than with early grapes. It occurs more, however, where the soil-conditions are alternately wet and dry than by reason of overcropping, or from a network of vigorous roots pushing into uncongenial soil.

Any diseased berries showing in the bunches should be immediately removed, as they quickly affect others touching them. Some growers take the shoulders off the bunches of Gros Colman when thinning. The result is better-shaped bunches, larger berries, and a reduction of the risk of shanking.

Where new rods are being grown to take place of old, crooked, or those with too many blind eyes, care should be taken that they are trained perfectly straight. Pinch the tips of any side shoots, but otherwise allow perfect freedom of growth. The terminal or main shoot must never be stopped during the growing season. In the winter it can be cut off at the apex of the roof, or at any height required.

All vine-houses should be provided with tanks, preferably of concrete, proportionate with the area of the house, for the storage of water. These can be supplied by the guttering from the roof. They should be built up level with the eave of the house. The borders can then be watered by a hose from a tap at a level with the surface of the ground. Sufficient gravitation is then provided for delivery equal to the height of the wall of the house; from below that, of course, it must be pumped.

Lime-sulphur Solution v. *Bordeaux Mixture*.—For prevention of leaf-curl on peach and nectarine trees these two mixtures have proved equally good at Ruakura Farm of Instruction, for on trees of the same variety sprayed with each mixture no sign of disease appeared.

The following return, compiled by the Motueka Harbourmaster, Mr. P. G. Moffatt, showing the quantity of fruit exported from the Motueka district in each fifth year since 1877, gives some idea of the development of the fruit industry in that part of the Dominion: 1877, 3,932 bushels; 1882, 7,494 bushels; 1887, 5,639 bushels; 1892, 19,665 bushels; 1897, 15,236 bushels; 1902, 48,234 bushels; 1907, 84,460 bushels; 1912, 144,086 bushels.—*T. W. Kirk.*

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

WHEN growing strongly, *asparagus* attains a considerable height, and there is danger of injury to the crowns from the effects of wind. The higher the stems the greater the leverage. It is important to preserve every stem, but there is not the slightest necessity to let them run up to a great height. My custom is to snick off the tops as soon as they begin to spread open freely. A flick with the knife does it. This has the effect of strengthening the side sprays, and quite as much growth is made as would be the case if the shoots were allowed to run up; but, development being by extension of side shoots, a denser mass of the wiry growth is obtained. One plant becomes interlaced with another all over the bed. The mutual support thus afforded strengthens the whole against the assault of wind, and obviates the necessity for staking and tying, a thing I have never found it necessary to do, except during the first summer after planting, when there is not enough stems to bind together; but even then not much help in the way of staking is necessary if the tops are checked in the manner indicated.

By this time most planting will be completed. *Savoy*s, *broccoli*, *Brussels sprouts*, and *cabbages* should all be out. Anything in arrear should be brought into line at once. Keep the soil loose between the rows, so as to conserve moisture, which is unlikely to be superabundant at this time. Some people are accustomed when planting *broccoli* and similar plants to throw a small quantity of artificial manure on the spot where each plant is to go, then when the planting is done—with the hoe, as it should be—the fertilizer becomes mixed with the soil about the roots of the young plants. It should be recognized that this application benefits the plants for a short time only—just gives them a start. The roots quickly get beyond the fertilizer, and, unless it is considered that the soil is rich enough to grow the plants, more should be given by broadcasting. Cultivation will work it in among the soil, and the rain will wash it down. Basic slag, superphosphate, and bonedust are all suitable. Apply just enough to dust over the surface of the soil, about the same as if it were grass-seed being sown.

A last sowing of *peas* may be put in. It is somewhat problematical what the result may be, usually not a very large crop is obtained

The best reward is obtained by sowing a *true* late variety. That local conditions have some bearing on the matter is made plain by an experience I had here several years ago. On the same day and on the same plot I sowed Sutton's Late Queen and Sutton's Latest of All. The former variety gave a quite satisfactory crop of good-flavoured peas; the latter was absolutely barren. This shows what valuable results might follow extensive trials of peas.

French beans may still be sown in quantity. At this time be careful to sow in a quite open situation, for crops sown from now onward will be bearing when the days are waning, hence advantage should be taken of all sunlight available. The last sowing of French beans may be made during the second week in February.

Carrot-seed put in now would produce serviceable roots of medium size. Short-horn varieties are most appropriate for sowing at this time. There would be no advantage in sowing if there is a crop advancing. They would become useless, just as when planted early in the spring. Some people prefer young carrots to those fully grown. This may supply a reason for sowing.

Sow *turnips* about seven weeks after the last lot was sown. Putting it another way, as soon as the first of a bed are fit for use it is time to sow again. Those in the first bed will remain fit for use just about as long as it will take to get another crop ready.

The same guide is safe with *radishes*: sow anew when you begin to pull from a bed.

Lettuce-seed should be put in a week or so before the first of those last sown are fit to cut, sowing or planting in a small area only.

Endive, being more hardy than lettuce, are best for winter use and may be sown now, and again a month hence. To get endive at the best they should be blanched. This is done in England by inverting a flower-pot over them and leaving it until the leaves are white. The advantage of covering is increased crispness and the elimination of the bitterness characteristic to endive. They can, however, be used without blanching.

If the supply of *red beet* is short put in seed of the turnip-rooted variety. These come quicker than the long sorts, and are on that account more reliable for late sowing.

Leeks.—The season being late, doubtless others are in the same position as myself regarding these—viz., a little to the rear. It, however, is not a matter of particular moment, for growth becomes more rapid as the days decline in length a little, and more moisture prevails. My method of planting is to select a well-worked plot of ground of fair richness; on this draw drills as for peas, the drills to be 15 in. apart; scatter along the drills a little bonedust and

superphosphate; when the dibber is thrust down to make the holes for the plants a portion of the fertilizers will be carried down, thus coming in close contact with the roots, which will thereby find it as soon as they begin to work. The leek-plants should be a fair size for planting; the stems should be about 8 in. long. Method of planting: thrust a dibber well down through the bottom of the drill, so as to make a hole 12 in. deep, about; thrust the root end of a plant well down, then lift it up far enough to straighten the roots; thrust the dibber in again 2 in. or 3 in. away from the hole, then force the handle over towards the plant, and the soil will be then closed firmly around the plant. Do not attempt to fill the hole by pushing in loose dirt—it cannot be satisfactorily accomplished. Some years ago an assistant in another place did it for me contrary to instructions. Every plant bolted to seed. Examination showed that the roots never got hold of the soil, and as it was not put firmly about them they became too dry to work. After the leeks have made a start to grow a little nitrate of soda sprinkled along the drills when rain is falling will help them. The quantity may be a teaspoonful to each plant.

Celery.—We are now at about the latest date for planting. Good strong plants put out now will succeed if they are supplied with plenty of water. It is useless to expect to grow celery in dry soil. It is perhaps the grossest feeder we cultivate, and responds well to a deluge of water. Still it should not be thought that it will not do well without large and constant supplies of water. It wants a lot of water at the start at this time of the year, for the soil is hot, and the weather trying. There should be plenty of manure below it. This holds moisture and keeps the roots cool. Rows planted earlier demand attention, varying according to the state of growth. Shortly after plants start into rapid growth they begin to spread out the lower leaves to a horizontal position. This must be corrected, or later on it will be found they cannot be got upright without breaking. Take them in time and mould up a little, just enough to keep the lower and refractory leaves upright. Further moulding-up I advocate being left till growth is complete. Then mould up completely in one operation. This is becoming the most general practice, though there are still some who adhere to the old plan of moulding up a little at a time as the plants grow. The disadvantage of this plan is that the banks of soil throw the water from many of the roots, and, except in very good and heavily manured soil, the plants suffer. The varieties of celery known as self-blanching, Henderson's White Plume and Golden Self-blanching, are really wrongly so called, because of their want of colouring-matter in stem and foliage. Moulding-up is necessary to promote brittleness.

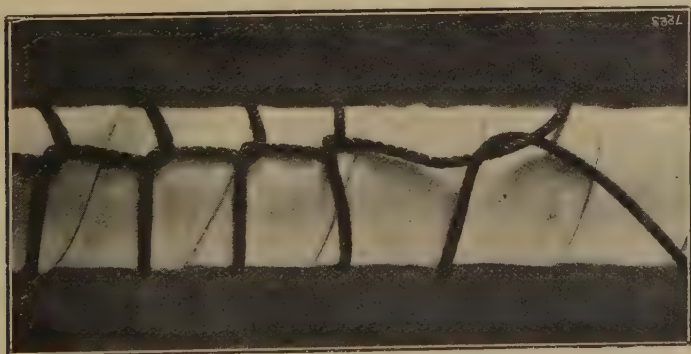
Red cabbages should be got out at once or they will not heart.

Shallots and *garlic* are nearing maturity. See that the cloves are not buried in the soil. If they are, clear it away so as to expose them to the air. If the soil is heavy, and breaks away overmuch, replace some of it with clean sand. The cloves finish well if half-covered with sand.

Rhubarb of the winter varieties may be pulled from in moderation. If the beds are established it is not wise to strip the clumps bare. If they have stooled out very much they are likely to produce very small stalks unless relieved. Chop off the outer parts with a spade, so as to reduce them to a moderate size. A few doses of liquid manure will help them a lot, but do not give it strong while the soil is dry, because in such case the plants, being thirsty, might absorb more of the strong stuff than would be good for them. Liquid manure is best applied soon after a good fall of rain. A mulch of manure will be beneficial to them.

TO MEND A HOSE.

VEXATIOUS and even serious delay is sometimes occasioned by the hose of the spraying outfit leaking and, maybe, becoming useless for effective work. A simple method of mending the hose has been designed by Mr. W. H. Taylor, the Horticulturist at the Weraroa Experimental Farm. This is to bandage the hose with strong canvas (in the manner indicated by the illustration), coated on the inside with a preparation consisting of



beeswax, resin, and linseed-oil. To prepare this, use an iron pot—or an old white-lead tin will do—and melt in it over a fire a lump of beeswax, and half the bulk of this of resin. When melted add about one-fourth of its bulk of linseed-oil. When required for use melt and apply at once. It is well to soak the twine used for binding the canvas to the hose in Stockholm tar before using, the binding being done by half-hitches. It would be as well to mention that the hose and canvas should be perfectly dry before applying the composition.

NARCISSI-CULTURE.

W. H. TAYLOR.

THESE bulbous flowers are among the most highly prized denizens of our gardens, and rightly so, for are they not the harbingers of spring and the heralds of awakening Nature after her winter rest? Though in this favoured land the sleep of winter is not so deep as it is in countries that lie under snow and frost, still we almost equally yearn for the coming of spring and the rehabilitation of our gardens. It is a poor soul who does not love the flowers.

The alpha of the narcissi race is the Paper-white bunch-flowered variety, Early Snowflake. The members of these march past in their glorious battalions till we get, as a rearguard, the beautiful double pheasant-eye and the not-very-beautiful biflorous, the omega of the race. Again they sleep, leaving the more varied hued flowers of warmer weather to fill their places. Most people know narcissi under the all-embracing name of "jonquils." This is quite wrong. But, after all, what does it matter?—"a rose by any other name would smell as sweet!" Whether they are called jonquils or any other name makes no difference to their appearance—detracts not one particle from their beauty. Still, there is, to some, enjoyment found in more complete knowledge. How few there are who think of flowers other than as mere adornments to the landscape, or give any consideration to the vast amount of labour and thought that has contributed to the evolution resulting in flowers—the marvellous creations seen in present-day types! Many flowers are surrounded with a halo of romance. Particularly is this the case with narcissi. There is fanciful romance in the very name. To most people Narcissus would suggest the name of a girl: it is not so. In Greek mythology Narcissus was the son of Cephissus and the nymph Liriope. Being possessed of a more than ordinary share of good looks, Narcissus became very vain, and as a punishment was caused to fall in love with himself on seeing his face reflected in water. He is said to have died of love-sickness, pining after his own image, and his name was given to a flower that sprang up on the place where he died. Thus the flower is shown to have been known in ancient times, and its first association was with punishment. And, strangely enough, the first notice we have of it in more modern but still far-away times

was again in connection with punishment, for the Romans, it is said, caused the death of criminals by giving them a bunch of these flowers to smell. This serves to show what a great change has been wrought in narcissi by the skill of cultivators and the evolution of time. I have no intention of writing an analytical dissertation on narcissi, nor to show the various changes that brought into being the modern types of flowers, but relate the foregoing particulars to show how ancient are the narcissi, and how worthy they are of more than the fleeting notice taken of them. As I have said, all the narcissi are commonly called jonquils. As a matter of fact, there are really very few jonquils, which are distinguished by the foliage being like rushes, and being deep-green in colour. The large double flowers, like Von Sion, are daffodils; all others are misnamed if called anything but narcissi.

This article was prompted by having recently seen a lot of narcissi dug up and laid out to dry while the foliage was still perfectly green. The bulbs were thought to be in the way. There was no intention to destroy them, but anything apparently is thought good enough for them after the flowers are past. This practice is really very prevalent. Sometimes the tops are cut off and the bulbs left in the ground. Either practice is very injurious to the bulbs. The function of the foliage is to build up the bulb again after flowering. In each bulb is stored up all the potentialities for the coming season. Cultivation—with certain reservations—will make little difference to the bulb after it has ripened off. The flower is stored up within it, and if this work has been imperfectly done no cultivation can improve it. This is proved by the fact that bulbs will open their flowers perfectly in vases filled with clear water, or in moist sand. This is a condition common to most true bulbs, but is not shared by corms, such as gladioli. The importance of a proper care of bulbs should be quite obvious. Briefly, cultivate the bulb and the flower will look after itself. There is no purpose to be served in writing about the various classes into which narcissi are divided. Any nursery catalogue will give them.

The cultivation of bulbs is quite simple, so long as one's operations are confined to the family in general and are not extended to certain delicate members, or a few others that are not delicate but require special conditions. For instance, the double-flowered *Poeticus*, known as "gardenia-flowered," is less frequently seen in flower than perhaps any other variety. It is said to require a considerable amount of water at flowering-time, and cool conditions—to be, in fact, a semi-bog plant. It is the latest, or almost the latest, to flower, and naturally comes when days are getting warm. The conditions of our climate are not favourable to it, consequently the flower-head usually withers soon after it shows above ground.

Nearly all bulbs, as well as narcissi, require a soil of a non-binding description, well drained, and deeply worked. Though a certain richness of soil is required, rank manure should not be in close contact with the bulbs. If manure is dug into the beds it should be put deep down, so that the roots will not reach it until the bulbs have been growing some time—in fact, these would have to travel for it, when by the time they reach it much of its rankness will have departed. The best way to renovate worn soil is by the addition of new soil from an old pasture. This, if taken from the top spit, contains the roots of the grasses and fibre, and gives new life to the old soil. Bonedust in moderate quantity is good to add with the new soil. Top-dressing may be done in winter, or after the flowers are past, and may consist of any light vegetable mould, sand, remains of rubbish-fires—anything, in fact, that tends to keep the soil open. Best of all would be in most cases a mixture of top-spit soil mentioned above with leaf mould and sand mixed with it, and a 6 in. pot full of bonedust to each barrowful. The soil should be of such a character that the roots can work freely in it, the bulbs swell easily, and the foliage break through easily. As the bulbs like cool soil to work in during summer they should be planted deeply. The depth of soil above the bulbs should mainly be determined by the size of the bulb. The advice given by the late Mr. Peter Barr, one of the greatest celebrities in the narcissi world, is to make the hole three times as deep as the bulb is high, which means that there should be a depth of soil above the bulb equal to twice its height. Thus, some bulbs will be in holes 6 in. or 7 in. deep.

The time for planting begins earlier than many people think, for the polyanthus, or bunch-flowered sections, scarcely rest at all, the old foliage being scarcely dead when the new roots appear. This indicates that these sections, if treated naturally, should scarcely be out of the ground at all, and if they are to be lifted it should be done before the foliage is quite dead. If this is done, there appears to be little objection to keeping them out for a time, though doubtless the correct treatment is to replant immediately, while no advantage is gained by keeping any long out of the ground. In dry summers it is often very difficult to keep the soil from cracking above the clumps, the soil about the bulbs, having been undisturbed for some months, being liable to contract. This is a bad condition for various reasons. For one thing, it gives harbour to slugs, wood-lice, and other pests. A little loose soil of a sandy nature put over the clumps will rectify the evil. It is in any case a good plan to put a pile of sand over the clumps after the foliage is off: it serves to mark the spot, prevents cracking and drying-out, and no weeds will grow in the sand, or, at any rate, very few. Before the bulbs are due

to show above the surface this can be levelled down, and no digging-out of weeds is then required, the obvious risk of damage being averted. When planting the bulbs, if the soil is not of so kindly a nature as is desirable, a compost should be provided to cover the bulbs with. The chief characteristic required in the compost is a free non-binding property and comparative fineness. A first-rate mixture is provided by old potting-soil, meaning that which has been knocked out of pots that have been occupied by such things, for instance, as cinerarias, or by the soil left at the bottom of boxes that have been used to grow seedlings.

The Fertilizing Action of Sulphur (Jour. d'Agric. Prat., 5th September, 1912).—Previous experiments in France had shown that flowers of sulphur added in very small quantities to soil in pots caused a notable increase in the yield of the plants, and that the action of the sulphur was very weak when the soil had been previously sterilized. The present experiments showed the fertilizing action of the flowers of sulphur to be due to its stimulating effect on the bacteria which convert organic nitrogen compounds into ammonia, and also on the nitrifying organisms of the soil.



ROWS OF PEACHES IN ORCHARD OF MR. C. E. LOWES, BROOKLYN, NELSON.

THE POULTRY INDUSTRY.

F. C. BROWN.

FEBRUARY WORK.

ANY bird that moults a feather in February should be marketed or put in the pot: it will seldom or never prove profitable to feed any longer. The long-season layer is the only truly profitable bird, and this is the latest to moult. This fact has been well borne out by the egg-laying competitions.

For the bulk of the eggs in the dear season the pullets must, of course, be depended upon, as even the late moulters take a rest when eggs are most desired. Some poultry-keepers imagine that by forcing year-old birds to moult at this time they will come on to lay in the winter months. I know of several breeders who tried this scheme last year, but utterly failed in their objective. The birds moulted all right, but they failed to lay when expected—in fact, many of them moulted a second time before they resumed laying, and this was approaching the cheap-egg season.

Many of the more precocious pullets will be laying by now, but they are hardly likely to prove the profitable stock. Just when their eggs are worth more money they will probably go into a moult. On the other hand, the pullet which has reached a complete stage of development before laying, and which commences her egg-production about April, will, if properly handled, go right through the season, and, after proving a profitable bird in her first year, will moult in time to produce a good yield in the dear season of the following year. Even with birds hatched at the right time and not forced to prematurity there is always the risk of their moulting unless the management is right. In the first place there should be no violent change in the system of handling or feeding; then they should be placed in their winter quarters well before the laying-period, and they should not be placed immediately on a heavy nitrogenous diet before laying commences. In fact, there should be as little change in the diet as possible. Meat and its substitutes should be gradually introduced to the ration as the birds show indications of starting to lay. I have even seen the substitution of oats for wheat cause birds to go into a false moult. The necessity of uniformity in all matters pertaining to the developing layer is therefore seen to be imperative.

Keep a watchful eye on the young stock. There is no better time to cull. Be it ever remembered that the profit in poultry-keeping is

not so much determined by the gross return as the difference between cost of production and the market value. If a bird, therefore, does not promise to yield a good net profit, the sooner it is culled the better. Unless a cockerel exhibits exceptional promise it is not worth feeding any longer; indeed, if not sold at a fancy figure the cockerel too often shows a loss rather than a profit—that is, if the breeder considers his reputation and only sends out birds which will do credit to him.

Few farmers realize the value of marking their chickens in order to distinguish the young from the old stock when culling is necessary, as it is every season if only profitable birds are to be retained. There is no definite means of telling the age of a bird. This being so, the punching of a distinctive mark in the web of the foot is the only way of providing a means of age-determination. Again, few farmers realize that even in the best of flocks the egg-returns from second-season birds are at least 30 per cent. lower than in the pullet season, while the cost of production is just the same, while the yield more rapidly decreases after the second year. A punch for making eyelet-



holes in boots, which may be purchased from any ironmonger, will serve the purpose for marking the foot of the chickens when these are a few months old. The punch made for the purpose and the many variations in marking which the foot provides are illustrated. Do not delay in this necessary detail. It is the only means whereby the bad mistake may be obviated of sending a young profitable bird to market and retaining an old unprofitable one.

VERMIN.

At no time of the year will vermin multiply as they will in the warmer months of summer. To keep them in check continued vigilance is therefore imperative at the present time. Let the poultryman be lulled into no false sense of security. The best-managed plant in the

country has vermin in one shape or another. It is not to be thought that because they cannot be seen with the naked eye that vermin are not present. The most dangerous types are often the most difficult to discover. They are not only almost microscopic, but they seek seclusion in out-of-the-way corners and in the plumage in a way that demands the keenest observation night and day to disclose their whereabouts. Of course, cleanliness is the great safeguard; not a mere superficial cleanliness, but a cleanliness which implies the elimination of all hiding-places, such as cracks and crevices (for which purpose a good coating of tar is invaluable), and periodic applications of a spraying-material that is death to vermin, such as a strong carbolic or sulphur solution.

A fact to be remembered is that it is natural for a fowl to harbour vermin. It is often stated that the healthiest conditions under which a bird can live is for it to roost in a tree, but I have seen the limbs of a tree covered with red mite.

Of the different parasites affecting poultry red mite is the most objectionable of all. It is a night marauder, and owing to its habit of attacking the bird, by blood-sucking, after dark and avoiding the light of day thus escapes the observation of any but the keenest of men. Permitting no hiding-place for the mite and occasional spraying of the interior of the house are the best means of fighting the pest. Again, do not allow the perches to come in contact with the walls. When a house becomes infested it is impossible to say when the mites will be effectively controlled. I have found the surest way of cleaning a badly infested house was to clear out the perch system and fix the perches on inch gaspiping driven into the ground, keeping the pipes well greased for some time. Perches are sometimes suspended away from the walls, but so close to them that the feathers of the birds touch the walls. This is fighting the mite on the one hand and encouraging it on the other.

Body-lice are another form of parasite which bring about a debilitated condition of the bird unless kept in check. The dust bath, placed preferably in the open, under a shrub or bush, is the best preventive. Immediately a bird's beak is seen to be busy among its feathers the presence of body-lice may be regarded as certain. If body-lice are very prevalent in a flock, and the birds are at all confined, all the conditions are present for the formation of the habit of feather-pulling. In ninety-nine cases out of a hundred feather-pulling has been due to irritation caused by heavy infestation by lice.

Another distinct form of louse responsible for weakened stock and decreased returns is the variety which infests the head. This is much larger than the ordinary body-louse, which, by the way, is mostly found around the vent. I have received several inquiries lately in

regard to the cause of birds presenting an anæmic appearance. In each case the cause was found to be head-lice. A close examination of the head showed the lice—about half the size of a sheep-tick—with their heads buried deep in the flesh and gorged with blood. It is a singular thing that on making inquiries it was found that in each case the birds were being housed under the continuous-house system. With this trouble individual treatment is necessary, the light application to the head of an ointment composed of sulphur and lard being generally effective.

BROODY HENS.

Those having experience of only high-type White Leghorns in which the broody habit has been almost eliminated are apt to discredit the general-purpose breeds too much by reason of their greater tendency to go broody. And while this is undoubted—though the broody propensity is much less with the improved laying type of, say, the Black Orpingtons, Rocks, and Wyandottes than with the former types of the breeds—the trouble caused is greatly exaggerated; at least, it would not be nearly so bad were a proper system of handling the



A GOOD STYLE OF BROODY COOP.

broodies adopted. Not only is there a loss in regard to eggs when the birds are allowed to sit on the nests day after day, but the development of vermin is thereby encouraged. The houses should be visited every evening, and all broodies at once removed to the broody coop, which should be placed against each house. The coop should consist of at least three compartments. The first day's broodies should be placed in No. 1 compartment, the second day's in No. 2, and the

third day's in No. 3. As a rule, if the birds are taken from the nest on the first indication of broodiness they may be set free on the fourth day. Thus, if promptly attended to, the broodies in No. 1 coop may be liberated when the fourth day's broodies are being cooped, and these may then be placed in No. 1 compartment. A good style of broody coop is here illustrated. The measurements are as follow: 6 ft. long, 2 ft. high in front, 19 in. at the back; divided into three compartments. The floor is of $\frac{1}{2}$ in. wire netting, the sides having $\frac{3}{4}$ in. netting. The feed-trough is $4\frac{1}{2}$ in. inside measurement, and has a sloping lid of 7 in. at the back and 5 in. at the front, the opening for the birds to feed being 4 in. high. The floor is 8 in. from the ground. The width of the door in front is 10 in. The roof and the back are covered with flinkote over $\frac{1}{2}$ in. wire netting stretched on the frame.

TABLE-POULTRY.

Again the prices paid on the local market for poultry for the holiday markets proved the splendid values available to growers on the spot for anything of decent quality. I have seen young cockerels of no special quality and eleven-week ducks purchased on the feather at 10d. a pound. Cockerels of the Leghorn type realized 9d. This means that dressed cockerels have cost the city poulterer nearly 1s. a pound. This poulterer retailed the best of the ducks at 12s. a pair and the primer chickens at 10s. It is significant that purchasers of this class of poultry came back for more; whereas buyers of cheaper lines did not—as usual, the cheap article being dear in the long-run.

I was present on one occasion when a young farmer brought in a crate of crossbred cockerels of the heavier type, but hardly as well fattened as they could have been, and the poulterer immediately weighed them in his presence, and after again weighing the crate paid 10d. a pound on the difference in weight, and this without touching the birds. When I asked the buyer if he never examined poultry before purchasing he replied that he was compelled to where he knew nothing of the seller, but on the occasion referred to he knew the seller and the class of bird he brought in. When it is possible for the grower to deliver his poultry direct to the city poulterer the business is generally conducted on a satisfactory basis. The buyer weighs the birds in the crate and, after removing them, weighs the crate, the difference giving the actual weight of the birds. Thus the purchaser gets exactly what he pays for, the seller having to bear the loss of weight involved in the birds traveling. In this case the foolish idea of filling up a bird before shipment, then weighing it and expecting the purchaser at a distance to pay on that weight cannot work—the special filling-up is weighed back to him in droppings.

It is gratifying to see the principle of buying table-birds by weight extending. It is fairly general in Wellington at the present time.

Great improvement is needed in the methods adopted by many people for crating poultry for market. The coop should be well made and be high enough for the birds to stand in comfort, and without any wide openings at the sides for them to put their heads through. The bottom should be closely boarded, in order to obviate the broken legs which too often result from the batten bottoms generally employed. Too many birds should not be crowded into the one crate, especially with ducks. In the case of too many ducks crowded together the ducks get on top of one another and disfigurement of the carcase is caused by the bird on top scratching the one that happens to be underneath. This trouble was much in evidence with the ducks received by one Wellington poulterer during Christmas week. The ideal crate is one which, while fully protecting the birds and giving them decent breathing-space, is only of such a size that it can be handled with ease, placed on a scale for weighing, and can be easily carried through an ordinary doorway. I heard the other day of a man who had a crate made the size of the body of an express, with the result that it had to be tipped on end to get it into the poulterer's shop, and could not be placed on the scales to be weighed. Some Australian poultrymen give us a good lead in this respect. They have baskets in which to send their birds to market, and these only hold from a pair to three or four birds.

SINGLE PENS.

A subscriber desires some particulars and the measurements of the single pens in use in Australia. I cannot do better than quote from the article on the subject by Mr. D. F. Laurie, the South Australian Government Expert, and publish the plans issued in connection therewith. I would point out, however, that the plans in question would be considerably improved by providing for a door to each pen through the back of the little building, for facilitating the work of egg-collecting and for cleaning out. A gate would also be required, as in the plan, for feeding purposes.

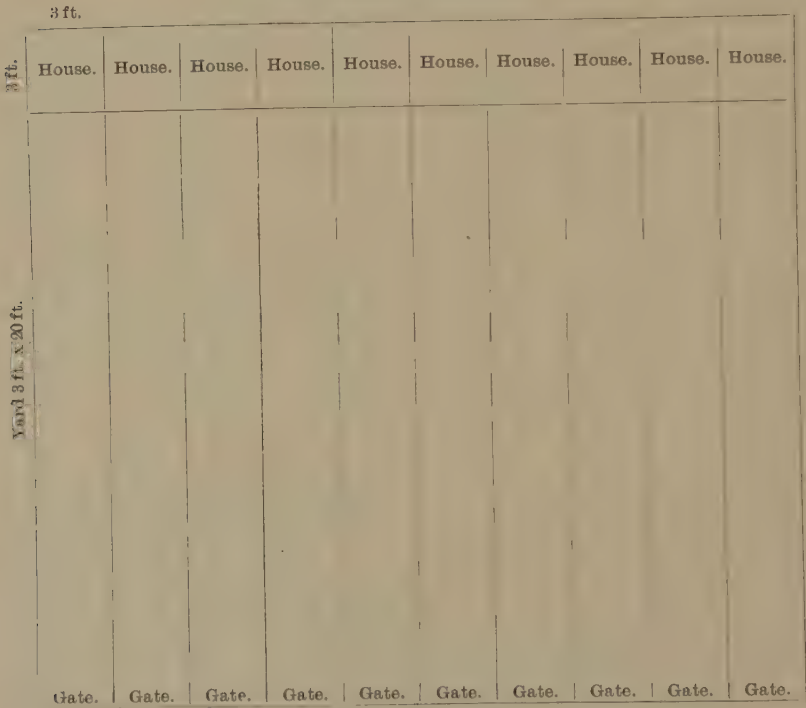
Following is Mr. Laurie's description of single pens:—

The single pens may be fixed or movable. The dimensions of the pens need not be more than 3 ft. by 20 ft., and the roosting and laying house 3 ft. square. To have the yards less than 3 ft. in width is inconvenient for the average person; any additional width adds to the expense of construction. Portable pens allow the ground to be changed daily, and where grass, clover, &c., are abundant this method is much appreciated by the birds. Fixed pens are more convenient where large numbers of birds are being simultaneously tested. In all cases the pen, portable or fixed, should be numbered, and the hen therein should also have a leg-band with a corresponding number.

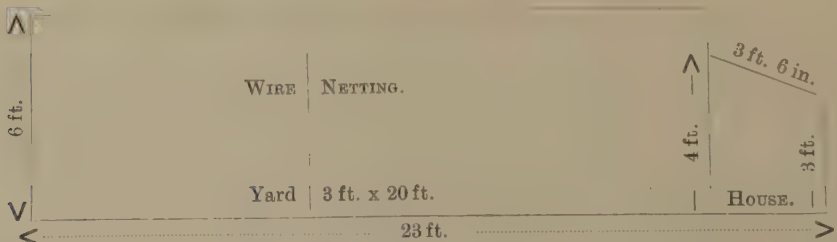
The continuous shed is most suited to this climate, and a permanent structure should be of the following dimensions for testing twenty pullets: Length, 60 ft.; height in front, 4 ft.; height at back, 3 ft. Set out two lines of posts, each 3 in. by 2 in.

and 3 ft. apart inside, posts in each line to be spaced 3 ft. apart from centre to centre : set them about 18 in. in the ground and in perfect line and level at top. Now securely spike a soft-wood rail, 2 in. by 2 in., and housed flush into the posts and level with the top of back row of posts. A rail of same dimensions is similarly affixed to and 2 ft. from the tops of the front row of posts, which should be 6 ft. above the ground. The iron forming the back of the house is buried 6 in. deep in the ground and then securely fastened to the top rail. As 3 ft. 6 in. sheets of iron are not made, a 7 ft. sheet cut in half serves the purpose. The roof is made of 7 ft. sheets cut in half, and will then allow for a few inches to overhang front and back. The house-divisions between the pens are best made of plain (flat) galvanized iron nailed to the posts and cut at top to the slope of the roof : the bottom should be buried in the ground about 3 in. or 4 in. A single sheet of corrugated iron, of which 2 in. are turned back, fastened in front of the house will provide ample shelter and act as a screen, giving privacy to the hen and allow 14 in. space for the hen to enter. This front screen may be held in position in several

SINGLE TESTING-PENS.



GROUND PLAN.—TEN TESTING YARDS AND HOUSES.



SIDE ELEVATION OF YARD AND HOUSE.

ways so as to be readily removed, or it may be permanently fixed. The opening left is 1 ft. 2 in. wide, and as the house is so small is sufficient to enable the eggs to be reached and the house to be kept clean. A shallow nest is hollowed out in the ground and lined with short straw or dry grass; a perch 1 ft. long and resting on a peg driven into the ground is all that is required. For a 20 ft. run two additional posts are required, and should stand 6 ft. out of the ground and level with those forming the front of the house; the end post should be strutted. The wire-netting covering may be of 2 in. mesh, or smaller, and 6 ft. 6 in. wide. It must be let into the ground 6 in., and should be fastened to a galvanized wire, No. 8 gauge, tightly stretched from post to post at the bottom of the trench. This will prevent the hens from scratching holes and passing from one pen to another. Gates 3 ft. wide may be made of soft wood, 2 in. by 1 in., bolted together with $\frac{1}{4}$ in. bolts and hung on stout tee hinges; the gate is covered with netting securely fixed. The pens should be roofed with wire netting stretched tightly, and laced with binding-wire to the netting forming the divisions. The door or gate should be provided with a reliable fastening, or may be padlocked for greater security. The runs may be floored with grass, hay, or short straw to a depth of 6 in. to afford exercise to the hen in scratching for grain, seeds, &c.; this is an important consideration with fixed pens. Portable pens must be strongly constructed and be placed on level ground, otherwise there is some danger that the hen will scratch her way out. Keep the hens busily employed scratching all day. In wet climates it may be necessary to cover the runs to keep them dry, but the hens will not remain so healthy. In cold climates the construction must be modified to suit low temperatures, and the house must be deeper, so that a drop-curtain may be used if necessary. There should be near the gate a small movable shelter, under which the food-trough and water-vessel, grit, and charcoal-hopper may stand. In very severe climates (hot or cold) the back and roof may be protected with a layer of several inches of straw thatching, kept in position by wire netting of large mesh. This is very effective, and can be speedily renewed as required.

THINGS TO BE REMEMBERED.

Leggy, knock-kneed, loosely feathered birds indicate physical weakness.

When turning out a superior article and marketing it in a proper manner, you not only secure a high price, but also the credit of producing it.

On every plant in the country culling can now be done with advantage. There is no room for sentiment or delay with doubtful stock.

In introducing new stock patronize flocks that are known to be free from disease. Buy only from a man who keeps his plant in a thoroughly clean state.

When selecting cockerels for next season's breeding-pens, let strong constitution be your first consideration; then look to pedigree of performance.

Don't starve the moulting hens because they are not laying. The length of the next laying-period largely depends on the attention the birds receive now.

The annual value of Irish eggs is estimated at £4,000,000, while Ireland exports more than £800,000 worth of eggs yearly. In the last ten years the stock of poultry is said to have risen in Ireland from 18,000,000 to 24,000,000 birds.

CO-OPERATIVE EXPERIMENT RECORD.

SWEDE-TURNIP TRIALS.

SOUTH ISLAND.

1911-12.

A. MACPHERSON.

Variety Test, conducted by the Special School for Boys, Otekaike.

THE land selected was a light free soil with clay subsoil; in grass 1905 to 1909; ploughed and crop of potatoes taken off in 1910; ploughed in September and November, 1911; disc-harrowed twice and tine-harrowed in December, 1911. The seeds were drilled in on 20th December, 1911, drills 3 ft. apart. No fertilizers were applied. The roots were pulled and weighed on 22nd June, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
1	Montgomery and Co.'s Skirvings	11.78	3.92
2	Garton's Superlative	10.41	3.73
3	" Victory	11.59	2.94
4	" Incomparable	17.67	5.10
5	" Cropwell	13.16	3.53
6	" Green Tankard	15.12	3.53
7	" Keepwell	15.91	3.73
8	" Model	7.26	2.84
9	" Pioneer	11.98	3.53
10	Sutton's Magnum Bonum	10.21	2.55
11	" Champion	11.00	2.75

Inspector Reid reports: The test was sown rather late in the season for the locality. All varieties braided well. The roots were sound and of good quality.

OAMARU DISTRICT.

Manurial and Variety Tests, conducted by A. H. Copland, Ardgowan.

THE land selected was a medium loam on a clay subsoil, and was in grass for six years previous to being broken up in February, 1911, for present experiment. It was disc-harrowed twice in April, tine-harrowed in May; cultivated three times and ploughed in August; tine-harrowed four times in September; tine-harrowed three times in November; thrown into raised drills and the seeds and fertilizers sown on 13th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. The soil in the plots was uniform

in character. In the variety test 4 cwt. superphosphate per acre was supplied. The crop was pulled and weighed on 15th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	£ s. d. 0 7 2	Tons. 21.1	Tons. 2.58	Tons. Loss, 19.95
2	Superphosphate, 3 cwt. ..	0 14 4	17.62	2.12	„ 23.43
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	38.80	1.08	„ 2.25
4	No manure .. ..	.. ..	41.05	1.35	.. ..
5	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt.; sulphate of potash, $\frac{1}{4}$ cwt. ..	0 17 10	38.80	1.08	Loss, 2.25
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	43.20	1.35	Gain, 2.15
7	No. 6 mixture, $1\frac{1}{2}$ cwt.; salt, 14 lb. ..	0 9 3	41.05	1.08	.. ..
8	Albatross guano, 2 cwt. ..	0 10 0	38.80	1.08	Loss, 2.25

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
1	Hurst and Son's Select Monarch ..	Tons. 38.80	Tons. 0.80
2	„ XL All ..	34.57	0.80
3	„ Best of All ..	36.73	1.08
4	Webb and Son's New Empire ..	25.92	0.54
5	„ Giant King ..	25.92	0.80
6	„ Imperial ..	32.41	0.80
7	„ New Buffalo ..	23.76	0.54
8	Nimmo and Blair's Standard ..	21.60	0.54
9	„ John Bull ..	23.76	0.54
10	Sutton's Queen ..	36.73	1.08
11	„ Crimson King ..	38.80	1.34
12	„ Champion ..	38.35	1.08
13	„ Elephant ..	30.25	0.54
14	„ Magnum Bonum ..	16.20	0.27
15	Garton's Pioneer ..	17.28	0.27
16	„ Model ..	19.44	0.27
17	„ Green Tankard ..	23.76	0.54
18	„ Perfection ..	36.73	1.08
19	„ Cropwell ..	38.35	1.08
20	„ Keepwell ..	17.28	0.27
21	„ Incomparable ..	34.57	0.80
22	„ Superlative ..	34.57	0.80
23	„ Victory ..	25.92	0.54
24	Montgomery and Co.'s Skirvings ..	23.76	0.54

Inspector Taylor reports: The seeds were sown under favourable conditions, but cold and wet weather followed; the crop suffered in consequence, being stunted in growth. No disease was observable in any of the varieties.

PALMERSTON SOUTH DISTRICT.

Manurial Test, conducted by William Aubrey, Bushy, Palmerston South.

The land selected for the experiment was a clayey loam on a clay subsoil. It was in grass for three years prior to 1909, when it was broken up and a crop of turnips taken. In oats, 1910. For the present experiment it was ploughed 23rd May, 1911, disc-harrowed twice 30th October, and tine-harrowed twice and rolled in November, 1911. The area was divided into seven manurial plots and one unmanured plot as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. The seed and fertilizers were sown in raised drills 26 in. apart on 17th November, 1911. The roots were pulled and weighed on 22nd June, 1912. Results:—

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	24.48	1.63	Gain, 24.48
2	Superphosphate, 3 cwt. ..	0 14 4	24.75	1.63	.. 24.75
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	31.55	1.90	.. 31.55
4	No manure (seed braided, plants were weakly, and no roots were formed).				
5	No. 3 mixture, 2¾ cwt.; sulphate of potash, ¼ cwt. ..	0 17 10	32.64	2.17	Gain, 32.64
6	No. 5 mixture, 1½ cwt.	0 8 11	22.30	1.08	.. 22.30
7	No. 6 mixture, 1½ cwt.; salt, 14 lb. ..	0 9 3	23.66	1.63	.. 23.66
8	Albatross guano, 2 cwt. ..	0 10 0	21.76	1.36	.. 21.76

Inspector Dalgliesh reports: The weather was very wet after sowing, which rendered the thinning and keeping of plots free from weeds difficult. A very noticeable feature in this experiment was plot No. 4, which braided but made little or no progress afterwards, forming no roots. All plots with this exception bore a very healthy appearance when harvested. This test was grown alongside swedes put in by experimenter apart from experimental purposes, and there was a marked contrast in favour of the test.

SUTTON DISTRICT.

Variety Test, conducted by Walter Scott, Sutton.

The land selected was a black loam on a sandy subsoil. It was in native pasture, surface-sown with English grasses, but not cultivated until broken up for this experiment in August, 1911. It was disc-harrowed twice, tine-harrowed twice, and rolled in August, 1911; disc-harrowed twice, tine-harrowed twice, and thrown into ridges in October, 1911. The seeds were sown on raised drills on 27th October, 1911; drills 28 in. apart. No fertilizers were applied. The crop was harvested on 10th June, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
1	Hurst and Son's East Lothian .. .	17.96	3.30
2	 Perfection .. .	32.90	3.87
3	 Lord Derby .. .	31.03	4.74
4	 Kangaroo .. .	34.34	4.84
5	 Select Monarch .. .	38.36	4.84
6	 XL All .. .	28.73	3.73
7	 Best of All .. .	22.99	3.73
8	Nimmo and Blair's Standard .. .	15.94	3.30
9	 John Bull .. .	17.09	3.30

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
10	Sutton's Queen	18-82	3-16
11	" Crimson King	17-38	3-44
12	" Champion	19-68	3-16
13	" Elephant	18-10	3-30
14	" Magnum Bonum	20-83	3-30
15	Garton's Pioneer	18-24	3-30
16	" Model	24-85	2-58
17	" Green Tankard*	24-28	3-01
18	" Perfection*	36-35	3-87
19	" Cropwell*	41-09	3-59
20	" Keepwell	40-23	5-17
21	" Incomparable	41-38	7-18
22	" Superlative	33-62	2-87
23	" Victory	30-46	2-73
24	Montgomery's Skirvings	36-20	4-88

* Affected with swede-turnip rot (*Phoma napo-brassicæ*).

Inspector Scott reports: The land was in good tilth at time of sowing. All varieties braided well. On account of extremely wet weather and a creek overflowing twice during Christmas week, 1911, plots 7 to 17 inclusive were under water each time, causing injury, consequently the yield of these plots was greatly reduced, and may account for the turnip-rot in plots 17, 18, and 19.

LAWRENCE DISTRICT.

Manurial and Variety Tests, conducted by J. and W. Smith, Waitahuna West.

The land selected was a free loam on a loamy subsoil, and had been in English grass six years prior to being broken up on 20th May, 1911, for this experiment. It was disc'd four times and tine-harrowed twice in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Agricultural Chemist. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 2 cwt. of Perfection manure was applied. The seeds and fertilizers were sown in raised drills on 11th and 12th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 25th and 27th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.	
			Roots.	Tops.		
		£ s. d.	Tons.	Tons.		Tons.
1	Superphosphate, 1½ cwt.	0 7 2	7-74	1-76	Gain,	2-30
2	Superphosphate, 3 cwt.	0 14 4	11-29	2-29	"	5-85
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	10-88	2-17	"	5-44
4	No manure .. .. .	.. ..	5-44	1-36	..	..
5	No. 3 mixture, 2¾ cwt.; sulphate of potash, ¼ cwt.	0 17 10	10-33	2-44	Gain,	4-89
6	No. 5 mixture, 1½ cwt.	0 8 11	11-97	3-26	"	6-53
7	No. 6 mixture, 1½ cwt.; salt, 14 lb.	0 9 3	14-55	4-35	"	9-11
8	Albatross guano, 2 cwt.	0 10 0	12-24	3-94	"	6-80

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
1	Hurst and Son's East Lothian	12.51	2.44
2	" Perfection	14.96	3.80
3	" Lord Derby	11.42	4.62
4	" Kangaroo	13.88	4.89
5	" Select Monarch*	14.69	4.62
6	" XL All*	12.51	2.72
7	" Best of All*	17.13	6.25
8	Webb and Son's New Empire	12.24	3.26
9	" Giant King*	10.33	3.80
10	" Imperial*	8.70	3.53
11	" New Buffalo	14.14	5.44
12	Nimmo and Blair's Standard	10.61	3.26
13	" John Bull	15.23	5.94
14	Sutton's Queen	14.41	4.08
15	" Crimson King*	14.14	4.35
16	" Champion	17.13	5.94
17	" Elephant	17.95	4.62
18	" Magnum Bonum*	15.77	6.25
19	Garton's Pioneer*	14.69	6.25
20	" Model	16.59	4.08
21	" Green Tankard	11.69	4.08
22	" Perfection	15.50	4.89
23	" Cropwell	14.69	5.44
24	" Keepwell	15.23	4.35
25	" Incomparable	14.69	4.89
26	" Superlative	10.33	2.44
27	" Victory	13.05	2.54
28	Montgomery and Co.'s Skirvings	13.33	5.71

* Affected with club-root.

Inspector Barron reports: The weather was changeable, rain and wind predominating. The ground, owing to wet weather, was not in the best condition for working at time of sowing. The majority of the varieties were good, but of small size. In the variety test the following plots were affected with club-root: No. 5 (badly). Nos. 6, 7, 9, 10, 15, 18, and 19 (slightly).

BALCLUTHA DISTRICT.

Manurial and Variety Tests, conducted by Henry Snushall, Clydevale.

The land selected was a sandy loam, and had been in turnips in 1906-7, in oats 1908-9, and in grass 1910. The land was ploughed for this experiment on 5th May, 1911; double-disced in November; tine-harrowed three times, and Cambridge-rolled in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a formula designed by the Agricultural Chemist. The soil in the plots was uniform in character. The variety of seed sown was Sutton's Magnum Bonum. In the variety test $1\frac{3}{4}$ cwt. superphosphate, $\frac{1}{4}$ cwt. bonodust, $\frac{1}{2}$ cwt. salt, and $\frac{1}{2}$ cwt. guano per acre was applied. The seed and fertilizers were sown in raised drills

on 15th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 24th July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	£ s. d. 0 7 2	Tons. 10.88	Tons. ..	Tons. Gain, 7.08
2	Superphosphate, 3 cwt. ..	0 14 4	14.14	..	.. 10.34
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	19.60	..	.. 9.53
4	No manure .. ..	.. ..	3.80	..	.. ..
5	No. 3 mixture, $2\frac{3}{4}$ cwt.; sulphate of potash, 28 lb. ..	0 17 10	25.30	..	Gain, 21.50
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	17.68	..	.. 13.88
7	No. 6 mixture, $1\frac{1}{2}$ cwt.; salt, 14 lb. ..	0 9 3	13.05	..	.. 9.25
8	Albatross guano, 2 cwt. ..	0 10 0	16.59	..	.. 12.79

VARIETY TEST.

Plot.	Variety.	Crop per Acre: Roots.
1	Hurst and Son's East Lothian	Tons. 14.96
2	 Perfection	29.10
3	 Lord Derby	23.39
4	 Kangaroo	20.94
5	 Select Monarch*	21.76
6	 XL All	27.20
7	 Best of All	29.92
8	Webb and Son's New Empire	20.40
9	 Giant King*	21.21
10	 Imperial	23.12
11	 New Buffalo	24.48
12	Nimmo and Blair's Standard	34.55
13	 John Bull*	18.77
14	Sutton's Queen	21.21
15	 Crimson King*	23.84
16	 Champion*	19.58
17	 Elephant*	18.22
18	 Magnum Bonum	27.74
19	Garton's Pioneer	20.40
20	 Model	21.49
21	 Green Tankard	16.86
22	 Perfection	27.74
23	 Cropwell*	35.36
24	 Keepwell	26.11
25	 Incomparable	16.86
26	 Superlative	19.85
27	 Victory	29.92
28	Montgomery and Co.'s Skirvings*	22.03

* Affected with club-root.

Manurial and Variety Tests, conducted by Joseph Moseley, Inch-Clutha.

The land selected was a sandy loam, and was in grass for three years prior to 1909, when ploughed and sown in rape, and in turnips 1910. For the present experiment

it was ploughed 6 in. deep on 2nd November, 1911; disc-harrowed twice, tine-harrowed, and cultivated twice in November; and tine-harrowed 12th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers were according to a scheme designed by the Agricultural Chemist. The soil in the plots was as uniform in character as possible. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 2 cwt. per acre of Challenge manure was applied. The seeds and fertilizers were sown in raised drills on 15th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 25th July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	25.30	3.53	..
2	Superphosphate, 3 cwt. ..	0 14 4	36.72	3.80	Gain, 11.42
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	28.83	2.99	.. 3.53
4	No manure ..	..	25.30	3.26	..
5	No. 3 mixture, 2½ cwt.; sulphate of potash, ¼ cwt. ..	0 17 10	27.74	3.80	Gain, 2.44
6	Half of No. 3 mixture, 1½ cwt. ..	0 8 11	36.72	3.53	.. 11.42
7	No. 6 mixture, 1½ cwt.; salt, 14 lb. ..	0 9 3	35.36	2.72	.. 10.06
8	Albatross guano 2 cwt. ..	0 10 0	35.36	2.85	.. 10.06

VARIETY TEST.

Plot.	Variety.	Crop per Acre: Roots.
		Tons.
1	Hurst and Son's East Lothian ..	27.74
2	.. Perfection ..	27.20
3	.. Lord Derby ..	28.02
4	.. Kangaroo ..	31.82
5	.. Select Monarch ..	27.20
6	.. XL All ..	25.02
7	.. Best of All ..	29.10
8	Webb and Son's New Empire ..	27.47
9	.. Giant King* ..	31.82
10	.. Imperial ..	38.35
11	.. New Buffalo ..	37.27
12	Nimmo and Blair's Standard ..	30.74
13	.. John Bull ..	37.27
14	Sutton's Queen ..	20.67
15	.. Crimson King* ..	33.73
16	.. Champion ..	33.46
17	.. Elephant* ..	35.91
18	.. Magnum Bonum ..	26.38
19	Garton's Pioneer ..	35.63
20	.. Model ..	24.21
21	.. Green Tankard ..	31.28
22	.. Perfection ..	36.99
23	.. Cropwell ..	33.46
24	.. Keepwell ..	30.46
25	.. Incomparable ..	39.99
26	.. Superlative ..	32.10
27	.. Victory ..	20.94
28	Montgomery and Co.'s Skirvings ..	32.37

* Affected with club-root.

Manurial and Variety Tests, conducted by Thomas Lowery, Lovell's Flat.

The land selected was a clayey loam, and was in turnips in 1906, in oats 1907, in wheat 1908, and in grass up to 12th July, 1911, when ploughed 8 in. deep for this experiment. Grubbed twice and tine-harrowed twice during November, and Cambridge-rolled 16th December, 1911. In the manurial test the area was divided into seven manurial and one unmanured plot as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a formula designed by the Agricultural Chemist. The soil in the plots was uniform in character. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 2 cwt. per acre of Surprise Island guano was applied. The seeds and fertilizers were sown in raised drills on 19th and 20th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 1st July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	21.49	0.81	Gain, 11.43
2	Superphosphate, 3 cwt. ..	0 14 4	23.39	1.36	" 13.33
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	22.58	1.62	" 12.52
2	No manure ..	..	10.06	0.54	..
5	No. 3 mixture, 2¾ cwt.; sulphate of potash, 28 lb. ..	0 17 10	23.94	1.62	Gain, 13.88
6	No. 5 mixture, 1½ cwt. ..	0 8 11	20.94	1.08	" 10.88
7	No. 6 mixture, 1½ cwt.; salt, 14 lb. ..	0 9 3	20.94	1.62	" 10.88
8	Albatross guano, 2 cwt. ..	0 10 0	19.58	1.08	" 9.52

VARIETY TEST.

Plot.	Variety.				Crop per Acre: Roots.
					Tons.
1	Hurst and Son's East Lothian ..	..	..	..	18.22
2	" Perfection ..	..	..	..	23.66
3	" Lord Derby ..	..	..	..	22.85
4	" Kangaroo ..	..	..	..	18.49
5	" Select Monarch ..	..	..	..	18.22
6	" XL All ..	..	..	..	18.77
7	" Best of All ..	..	..	..	18.49
8	Webb and Son's New Empire ..	..	..	..	22.03
9	" Giant King ..	..	..	..	22.58
10	" Imperial ..	..	..	..	17.95
11	" New Buffalo* ..	..	..	..	23.39
12	Nimmo and Blair's Standard ..	..	..	..	22.85
13	" John Bull* ..	..	..	..	25.57
14	Sutton's Queen ..	..	..	..	22.58
15	" Crimson King ..	..	..	..	18.22
16	" Champion ..	..	..	..	28.56
17	" Elephant ..	..	..	..	18.77
18	" Magnum Bonum ..	..	..	..	24.30
19	Garton's Pioneer ..	..	..	..	22.30
20	" Model ..	..	..	..	27.20
21	" Green Tankard ..	..	..	..	26.11
22	" Perfection ..	..	..	..	28.56
23	" Cropwell ..	..	..	..	23.12
24	" Keepwell ..	..	..	..	23.66

* Affected with club-root.

Manurial and Variety Test, conducted by Adam Houlston, Kakapuaka.

The land selected was a clayey loam on a clay subsoil, and had been in grass for six years prior to being ploughed up for this experiment on 4th April, 1911. It was double-diseed and cultivated twice in October, 1911; tine-harrowed and rolled with Cambridge roller in November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Agricultural Chemist. The soil in the plots was uniform in character. The variety of seed sown was Sutton's Magnum Bonum. In the variety test 3 cwt. of Surprise Island guano was applied per acre. The seeds and fertilizers were sown in raised drills on 23rd November, 1911; drills 26 in. apart. The roots were pulled and weighed on 6th July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	29.92	1.36	Gain 10.88
2	Superphosphate, 3 cwt. ..	0 14 4	36.72	1.90	" 17.68
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	32.64	1.90	" 13.60
4	No manure ..	..	19.04	1.09	..
5	No. 3 mixture, 2½ cwt.; sulphate of potash, ¼ cwt. ..	0 17 10	33.46	1.36	Gain, 14.42
6	No. 5 mixture, 1½ cwt. ..	0 8 11	30.74	1.36	" 11.70
7	No. 6 mixture, 1½ cwt.; salt, 14 lb. ..	0 9 3	26.66	0.81	" 7.62
8	Albatross guano, 2 cwt. ..	0 10 0	30.21	1.36	" 11.17

VARIETY TEST.

Plot.	Variety.	Crop per Acre: Roots.
		Tons.
1	Hurst and Son's East Lothian ..	27.20
2	" Perfection ..	30.19
3	" Lord Derby ..	29.92
4	" Kangaroo ..	30.46
5	" Select Monarch ..	33.19
6	" XL All ..	28.56
7	" Best of All ..	25.84
8	Webb and Son's New Empire ..	19.31
9	" Giant King ..	28.02
10	" Imperial ..	21.76
11	" New Buffalo ..	22.68
12	Nimmo and Blair's Standard ..	21.49
13	" John Bull ..	21.49
14	Sutton's Queen ..	21.21
15	" Crimson King ..	24.21
16	" Champion ..	23.66
17	" Elephant ..	22.58
18	" Magnum Bonum ..	20.94
19	Garton's Pioneer ..	18.22
20	" Model ..	18.22
21	" Green Tankard ..	15.50
22	" Perfection ..	14.96
23	" Cropwell ..	16.86
24	" Keepwell ..	20.13
25	" Incomparable ..	31.82
26	" Superlative ..	28.83
27	" Victory ..	28.56

Variety Test, conducted by Joseph Smith, Stirling.

The land selected was a sandy loam, and was in potatoes in 1910, previous to which it was four years in pasture. It was ploughed 6 in. deep for this experiment on 16th July, 1911; clod-crushed and tine-harrowed 6th September; clod-crushed and tine-harrowed 12th October; and rolled 28th October, 1911. The seeds were sown in raised

drills on 2nd November, 1911: drills 26 in. apart. 3 cwt. per acre of Fison's turnip-manure was applied. The roots were pulled and weighed on 25th July, 1912. Results:—

Plot.	Variety.						Crop per Acre : Roots.
							Tons.
1	Hurst and Son's	East Lothian	..	..	..	..	38.90
2	"	Perfection	..	..	..	..	41.35
3	"	Lord Derby	..	..	..	..	43.52
4	"	Kangaroo	..	..	..	..	38.63
5	"	Select Monarch	..	..	..	..	39.71
6	"	XL All ..	..	..	..	..	44.88
7	"	Best of All	..	..	..	..	46.79
8	Webb and Son's	New Empire*	..	..	..	..	39.44
9	"	Giant King	..	..	..	..	44.07
10	"	Imperial ..	..	..	..	..	40.80
11	"	New Buffalo	..	..	..	..	42.16
12	Nimmo and Blair's	Standard	..	..	..	..	41.35
13	"	John Bull*	..	..	..	..	43.52
14	Sutton's	Queen ..	..	..	..	..	38.63
15	"	Crimson King*	..	..	..	..	43.80
16	"	Champion	..	..	..	..	39.44
17	"	Elephant	..	..	..	..	50.87
18	"	Magnum Bonum ..	..	..	..	..	35.63
19	Garton's	Pioneer*	..	..	..	..	42.71
20	"	Model ..	..	..	..	..	39.99
21	"	Green Tankard ..	..	..	..	..	43.25
22	"	Perfection	..	..	..	..	46.52
23	"	Cropwell	..	..	..	..	40.26
24	"	Keepwell*	..	..	..	..	43.25
25	"	Incomparable	..	..	..	..	52.23
26	"	Superlative	..	..	..	..	38.90
27	"	Victory ..	..	..	..	..	41.35
28	Montgomery and Co.'s	Skirvings	..	..	..	..	55.22

* Affected with club-root.

TAPANUI DISTRICT.

Variety Test, conducted by Mark McAuley, Tapanui.

The land selected was a clayey loam on a clay subsoil, and was in turnips in 1906, in open fallow 1907, in oats 1908, then in grass to June, 1911, when ploughed for present experiment. It was disc-harrowed in August; disc-harrowed twice, tine-harrowed twice, and rolled with clod-crusher in December, 1911. The seeds and fertilizers were sown in raised drills on 19th December, 1911; drills 26 in. apart. 2 cwt. of Mataura turnip-manure per acre was applied. The crop was harvested on 26th June, 1912. Results:—

Plot.	Variety.						Crop per Acre.	
							Roots.	Tops.
							Tons.	Tons.
1	Hurst and Son's	East Lothian	..	..	..	..	11.69	2.99
2	"	Perfection	..	..	..	..	7.61	1.90
3	"	Lord Derby	..	..	..	..	10.06	2.44
4	"	Kangaroo	..	..	..	..	7.34	1.90
5	"	Select Monarch	..	..	..	..	14.41	2.72
6	"	XL All ..	..	..	..	..	9.52	2.17
7	"	Best of All	..	..	..	..	14.96	2.44
8	Nimmo and Blair's	Standard	..	..	..	..	10.06	2.17
9	"	John Bull	..	..	..	..	16.32	2.99
10	Sutton's	Queen ..	..	..	..	..	16.32	2.44
11	"	Crimson King	..	..	..	..	7.34	1.90
12	"	Champion	..	..	..	..	11.69	2.17
13	"	Elephant	..	..	..	..	11.15	2.17
14	"	Magnum Bonum	..	..	..	..	14.41	2.44

Plot.	Variety.						Crop per Acre.	
							Roots.	Tops.
							Tons.	Tons.
15	Garton's Pioneer	..	..	..	..	..	11.69	2.44
16	" Model ..	..	..	..	..	..	11.42	1.90
17	" Green Tankard ..	..	..	..	..	..	11.42	2.17
18	" Perfection ..	..	..	..	..	..	10.61	1.63
19	" Cropwell ..	..	..	..	..	..	12.51	1.90
20	" Keepwell ..	..	..	..	..	..	15.77	2.72
21	" Incomparable ..	..	..	..	..	..	4.89	1.08
22	" Superlative ..	..	..	..	..	..	8.16	1.63
23	" Victory ..	..	..	..	..	..	6.25	1.36
24	Montgomery and Co.'s Skirvings ..	..	..	..	..	..	11.69	2.72

Inspector McCulloch reports: The land was of a cold, sour nature. It was in good tilth at time of sowing. All varieties braided well. Subsequently, owing to the wet season and the sour nature of the soil, after-cultivation could not be given, and the crop made slow progress throughout, hence the unsatisfactory yields. All varieties were free from disease.

Variety Test, conducted by G. M. Love, Moa Flat, Heriot.

The land selected was a clayey loam on a clay subsoil, and was in pasture for ten years previous to 1910, in which year it was ploughed, and a crop of potatoes taken. For the present experiment it was ploughed in August, 1911, and disced and tine-harrowed to a fine tilth in November, 1911. The seeds were sown in raised drills on 6th November, 1911; drills 26 in. apart. 2½ cwt. of Rockland turnip-manure per acre was applied. The roots were pulled and weighed on 10th July, 1912. Results:—

Plot.	Variety.						Crop per Acre.	
							Roots.	Tops.
							Tons.	Tons.
1	Hurst and Son's East Lothian	..	..	..	..	..	14.96	0.27
2	" Perfection ..	..	..	..	..	..	23.94	0.27
3	" Lord Derby ..	..	..	..	..	..	18.50	1.08
4	" Kangaroo ..	..	..	..	..	..	20.13	1.36
5	" Select Monarch ..	..	..	..	..	..	24.48	1.36
6	" XL All ..	..	..	..	..	..	25.30	0.81
7	" Best of All ..	..	..	..	..	..	22.58	1.08
8	Nimmo and Blair's Standard	..	..	..	..	..	28.02	2.44
9	" John Bull ..	..	..	..	..	..	24.21	1.08
10	Sutton's Queen ..	..	..	..	..	..	19.04	0.27
11	" Crimson King ..	..	..	..	..	..	22.85	1.36
12	" Champion ..	..	..	..	..	..	20.67	1.36
13	" Elephant ..	..	..	..	..	..	24.21	2.17
14	" Magnum Bonum ..	..	..	..	..	..	24.48	1.63
15	Garton's Pioneer ..	..	..	..	..	..	22.58	1.63
16	" Model ..	..	..	..	..	..	19.86	0.27
17	" Green Tankard ..	..	..	..	..	..	21.49	1.36
18	" Perfection ..	..	..	..	..	..	20.67	0.81
19	" Cropwell ..	..	..	..	..	..	23.66	0.81
20	" Keepwell ..	..	..	..	..	..	22.85	0.81
21	" Incomparable ..	..	..	..	..	..	24.21	0.81
22	" Superlative ..	..	..	..	..	..	22.85	0.54
23	" Victory ..	..	..	..	..	..	17.63	1.08
24	Montgomery and Co.'s Skirvings ..	..	..	..	..	..	22.03	1.36

Inspector McCulloch reports: The soil was in excellent tilth to receive the seed. All varieties braided very badly—caused through raw, cold, and unfavourable weather for a few weeks after sowing. The roots that survived were of good size and quality and free from disease, with the exception of plot 1, which showed signs of swede-turnip rot (*Phoma napo-brassicæ*).

Variety Test, conducted by R. Potts, Crookston.

The land selected was a clayey loam on a clay subsoil, and in 1903 was in turnips; 1904, wheat; 1905, oats, and sown out with grass; 1906 to June, 1911, in pasture, when broken up and limed with ground lime at the rate of $4\frac{1}{2}$ cwt. per acre. Limed again in August, 1911, at the rate of 4 cwt. per acre; disc-harrowed twice in June, 1911; disc-harrowed and clod-crushed in October, and tine-harrowed 4th December, 1911. The seeds were sown in raised drills on 4th November, 1911, the drills being 26 in. apart. Mataura turnip-manure at the rate of $2\frac{1}{2}$ cwt. per acre was applied as a fertilizer. The roots were pulled and weighed on 28th June, 1912. Results:—

Plot.	Variety.					Crop per Acre.	
						Roots.	Tops.
						Tons.	Tons.
1	Hurst and Son's East Lothian	..	..	..	..	24.48	1.63
2	" Perfection	..	..	..	..	29.11	2.44
3	" Lord Derby	..	..	..	..	23.12	2.44
4	" Kangaroo	..	..	..	..	26.38	3.53
5	" Select Monarch	..	..	..	..	27.20	2.72
6	" XL All	..	..	..	..	28.56	1.63
7	" Best of All	..	..	..	..	33.19	2.72
8	Nimmo and Blair's Standard	..	..	..	..	29.92	2.99
9	" John Bull	..	..	..	..	32.37	3.80
10	Sutton's Queen	..	..	..	..	25.84	1.90
11	" Crimson King	..	..	..	..	33.19	2.17
12	" Champion	..	..	..	..	32.37	2.17
13	" Elephant	..	..	..	..	37.27	2.72
14	" Magnum Bonum	..	..	..	..	35.09	2.99
15	Garton's Pioneer	..	..	..	..	31.01	2.72
16	" Model	..	..	..	..	34.00	1.36
17	" Green Tankard	..	..	..	..	30.47	2.99
18	" Perfection	..	..	..	..	33.46	2.44
19	" Cropwell	..	..	..	..	37.00	2.99
20	" Keepwell	..	..	..	..	34.55	2.99
21	" Incomparable	..	..	..	..	40.53	3.26
22	" Superlative	..	..	..	..	36.72	1.63
23	" Victory	..	..	..	..	33.46	1.36
24	Montgomery and Co.'s Skirvings	..	..	..	..	37.00	2.72

Inspector McCulloch reports: The land was in splendid tilth at time of sowing. All varieties braided well, but the growth afterwards was slow owing to lack of sunshine and heat. No disease of any sort was apparent at time of weighing the crop, but some time afterwards turnip-rot (*Phoma napo-brassicæ*) appeared in patches in all varieties.

BARLEY TRIALS.**CONDUCTED ON THE MARTON PLOTS.**

G. DE S. BAYLIS.

On the 18th March, 1912, plots 21 to 29 were selected on which to test the value of the several varieties of barley for forage purposes. Each variety was sown on two adjacent plots, the odd numbers being 1 acre in extent, and the even numbers one-tenth of an acre. In every case upon the acre plots wheat had been the crop grown during the previous season; the same manure mixture had been used, and at the same rate per acre. Of the one-tenth-acre plots 22 and 24 had been in barley the previous season, while 26, 28, 30, had been in oats. The same treatment as regards manure had been applied to each plot.

These plots were ploughed out of stubble early in March, disced, harrowed twice, rolled once. They were sown towards the end of March with as near the same quantity of seed and fertilizer as the drill would put out.

These plots were fenced off into $1\frac{1}{10}$ acres of each variety—viz., the two adjacent plots. They were all grazed simultaneously by sheep, and were grazed until each plot presented the same appearance as regards feed—viz., until there was next to no feed left.

The tabulation shows the names of varieties, and sheep carried thereon.

Variety of Barley.	Sheep carried.	Dates.		Total Days.	Sheep.	Days.
Black Russian ..	20	May	16-22	6	20	6-0
	20	June	20-27	7	20	7-0
	20	Aug.	5-7 $\frac{1}{2}$	2 $\frac{1}{2}$	20	2-5
	16	Sept.	9-14	5	20	4-0
					20	19-5
White Russian..	20	May	16-22	6	20	6-0
	20	June	20-27	7	20	7-0
	20	Aug.	5-7 $\frac{1}{2}$	2 $\frac{1}{2}$	20	2-5
	16	Sept.	9-14	5	20	4-0
					20	19-5
Cape Barley ..	20	May	16-21	5	20	5-0
	20	June	20-25	5	20	5-0
	20	Aug.	5-7 $\frac{1}{2}$	2 $\frac{1}{2}$	20	2-5
	40	Aug.	7 $\frac{1}{2}$	$\frac{1}{2}$	20	1-0
	16	Sept.	9-15	6	20	4-8
					20	18-3
Hannchen ..	20	May	16-24	8	20	8-0
	20	June	20-29	9	20	9-0
	20	Aug.	5-7 $\frac{1}{2}$	2 $\frac{1}{2}$	20	2-5
	16	Sept.	9-16	7	20	5-6
					20	25-1
Swan-neck ..	20	May	16-24	8	20	8-0
	20	June	20-29	9	20	9-0
	20	Aug.	5-7 $\frac{1}{2}$	2 $\frac{1}{2}$	20	2-5
	60	Aug.	7 $\frac{1}{2}$	$\frac{1}{2}$	20	1-5
	16	Sept.	9-17	8	20	6-4
	43	Sept.	17-19	2	20	4-3
					20	31-7

The results of these trials indicate that both the Black and White Russian varieties yield rather better grazing—viz., 1-2 more days for twenty sheep—than does the Cape, which in these trials has afforded less grazing than any of the varieties tested, only carrying between 16th May and 15th September twenty sheep for a total period of 18-3 days. Both the Russian varieties are equal, carrying twenty sheep each for a total period of 19-5 days. Hannchen does rather better still, carrying twenty sheep for a total period of 25-1 days; while Swan-neck tops the list by carrying twenty sheep for a total period of 31-7 days on the $1\frac{1}{10}$ acres, which works out at just about twenty sheep to the acre for a total period of twenty-nine days between 16th May and 19th September.

Both the Russian varieties have a broader leaf than any of the others, and from appearance deceive the eye by suggesting that they throw more feed than either of the Swedish varieties, the foliage of which is less harsh and more slender.

The ability to stool freely is perhaps a weighty consideration when selecting a variety of barley purely for grazing purposes, and both Swedish varieties would appear to possess this characteristic.

Another point which should be taken into consideration when selecting a barley for autumn sowing for the purpose of early spring feed, and that is if it naturally matures early or late. Both the Cape and the Swan-neck (the latter especially) appeared about August to have exhibited a strong inclination to make growth, with the result that additional stock had to be crowded on to cope with the growth made; and even then, in case of the Swan-neck, a longer period was required to reduce it to the level of the other varieties.

I do not consider that either the number of sheep carried, or the number of days grazing obtained on any of these plots, is large, but, considering the season, they were sown perhaps rather late. Also it must be remembered that Marton Junction soils are wet and cold, and little growth is made thereon in the winter.

The fact that the Swan-neck barley starts to make a more vigorous growth quite early in spring than do most other varieties is, to my mind, a feature which points to the Swan-neck variety as likely to prove itself an exceedingly valuable one for the provision of green feed at the most critical time of the stockman's year.

Both Hannchen and Swan-neck are Swedish barleys, and are some of the productions of the Institution at Svalof, which has done so much to improve cereals, legumes, and other plants. These barleys were imported from Sweden by the Agricultural Department at the same time as were Grenadier wheat, White Ligowo oats, Victory oats, and Beardless Propsteier.

GRASS-VARIETY TRIALS.

M A R A E K A K A H O.

G. DE S. BAYLIS.

SITUATED on the flat at the foot of the hills on the Hastings side, and some distance below the wool-shed at Mr. R. D. D. McLean's property, land was prepared at short notice for the following experiments. The period elapsing between the ploughing-up and the sowing-down was not long enough to give opportunity to kill the weed-seeds which infested the soil. Added to which the season had been a very dry one, and practically no weed-seeds germinated during the short interval allowed between ploughing and sowing. After sowing another dry spell was experienced, and the time taken to germinate, and the power to hang on with the few established roots till rain again arrived, became a great factor in deciding as to what grasses obtained even a start in these trials.

It is well known, however, that no kind of season is too unfavourable for the growth of weeds, and this apparently was the case here, for although many of the grasses did not germinate well the weeds did, and wherever a percentage of the grass-seed had germinated it became a matter of considerable doubt as to which would obtain ultimate possession. Those plots which have now established possession may be regarded as a demonstration of a trial of strength between the prevalent weeds in the soil and the grasses sown, resulting in the survival of the fittest.

The plots were sown in March, 1910, without manure. The area of most of the plots was one-eighth acre.

The following notes were taken by me on the dates mentioned. The notes on the 18th September were taken by Mr. H. Overton, Manager of Maraekakaho.

1. *Perennial Rye*.—July 14, 1910: A good take; very weedy, which latter remark applies to all plots; growth about 4 in. Oct. 25, 1911: Doing well. May 9, 1912: Still a fair sward. Sept. 18: Good.
2. *Italian Rye-grass*.—July 14, 1910: More forward than perennial; soon be ready for feeding. May 5, 1912: Becoming patchy and weedy; not nearly as good now as perennial rye. Sept. 18, 1912: Fair.
3. *Prairie*.—July 14, 1910: Fair but thin take; has made about as much growth as perennial rye. Oct. 25, 1911: Patchy and full of weeds. May 25, 1912: Still much as on Oct. 25, 1911. Sept. 18, 1912: Fair.
4. *Dogstail*.—July 14, 1910: Good take; should make a good stand. Oct. 25, 1911: Has formed a fair sward. May 5, 1912: Thin. Sept. 18, 1912: Fair.

5. *Sheep's Fescue*.—July 14, 1910 : Slow growth ; hardly established yet. Oct. 25, 1911 : Much improved. May 5, 1912 : A good deal present, but by no means dense. Sept. 18, 1912 : Poor.
6. *Hard Fescue*.—July 14, 1910 : Very weedy ; little grass present. Oct. 25, 1911 : Medium take only. May 5, 1912 : Patchy. Sept. 18, 1912 : Fair.
7. *Chewing's Fescue*.—July 14, 1910 : Very weedy. Oct. 25, 1911 : A good stand. May 5, 1912 : Very fair indeed ; has formed a very fair bottom, and has been closely grazed. Sept. 18, 1912 : A really good plot.
8. *Bromus inermis*.—July 14, 1910 : Probably a failure ; a mass of weeds. Oct. 25, 1911 : Not much present. May 5, 1912 : A few plants in evidence. Sept. 18, 1912 : Fair.
9. *Cocksfoot*.—July 14, 1910 : A good take ; growth about 3 in. Oct. 25, 1911 : Looks well ; good sward. May 5, 1912 : The best of the lot so far ; a good sward. Sept. 18, 1912 : A splendid plant.
10. *Timothy*.—July 14, 1910 : Might make a stand ; growth about 2 in. ; much as dogtail. Oct. 25, 1911 : A medium stand. May 5, 1912 : Not so good a take or so much growth as cocksfoot. Sept. 18, 1912 : Late but coming on nicely.
11. *Meadow Foxtail*.—July 14, 1910 : Medium take ; backward growth. Oct. 25, 1911 : Has taken fairly well and is in flower. May 5, 1912 : Rather patchy. Sept. 18, 1912 : Good plant.
12. *Tall Oat*.—July 14, 1910 : Should make a fair stand ; growth quicker than cocksfoot. Oct. 25, 1911 : Fair stand. May 5, 1912 : Much as before ; a thin take. Sept. 18, 1912 : Only half a plant.
13. *Agrostis vulgaris* (Red-top).—July 14, 1910 : Good take. Oct. 25, 1911 : This appears now as one of the best plots. May 5, 1912 : Spreading out well, but not too good in the bottom. Sept. 18, 1912 : Strong plant, but thin on ground.
14. *Agrostis canina*.—July 14, 1910 : Good take ; much too young as yet for grazing ; would not be ready till spring. Oct. 25, 1911 : Making a fair sward. May 5, 1912 : Much closer and denser than *vulgaris* ; close, green, and healthy. Sept. 18, 1912 : Splendid sward ; best in the field.
15. *Agrostis stolonifera* (Fiorin).—July 14, 1910 : Good take ; growth much same condition as *canina*. Oct. 25, 1911 : Forming close sward. May 5, 1912 : Almost but not quite so good as *canina*. Stock appear to have let this variety run rather more to seed than *canina*. Sept. 18, 1912 : A good plant.
16. *Poa pratensis*.—July 14, 1910 : Appears indigenous to soil. Sept. 18, 1912 : Good plant.
17. *Poa trivialis*.—July 14, 1910 : Good take. Oct. 25, 1911 : Dense sward. May 5, 1912 : Very patchy and weedy ; bulk of original plant appears to have died out. Sept. 18, 1912 : Poor.
18. *Danthonia pilosa*.—July 14, 1910 : Poor germination. Oct. 25, 1911 : Only a little present. May 5, 1912 : Never germinated well at the start. Sept. 18, 1912 : Poor.
19. *Danthonia semiannularis*.—July 14, 1910 : Poor germination. Oct. 25, 1911 : Present but patchy. May 5, 1912 : Never germinated well at start. Sept. 18, 1912 : A fair take but a poor-looking grass.
20. *Paspalum dilatatum*.—July 14, 1910 : Doubtful if present. Sept. 18, 1912 : Very little to be seen.
21. *Sheep's Burnet*.—July 14, 1910 : Very thin take. Oct. 25, 1911 : Patchy. May 5, 1912 : Only taken in patches, but appears there to have established itself. Sept. 18, 1912 : Poor take.
22. *Yarrow*.—July 14, 1910 : Good take ; good growth. Stock could not readily pull it up now. Oct. 25, 1911 : Well-formed sward. May 5, 1912 : Sheep have kept it eaten close. A good sward. Sept. 18, 1912 : A very good sole.
23. *Microlaena stipoides*.—May 5, 1912 : Patchy. Sept. 18, 1912 : Good.
24. *Phalaris bulbosa*.—July 14, 1910 : Good stand, rather thin, good growth, equal to Prairie. Should soon be ready for feeding. Oct. 25, 1911 : Patchy, but good. Stock are fond of it. May 5, 1912 : Thin but healthy. Is it going to stay ? Sept. 18, 1912 : Good strong plant.

25. *Cow-grass*.—July 14, 1910 : Only fair take. Oct. 25, 1911 : Fairly good. May 5, 1912 : Thin stand ; little growth. Sept. 18, 1912 : Only fair.
26. *White Clover*.—July 14, 1910 : Medium take. Oct. 25, 1911 : Thin. Sept. 18, 1912 : Poor.
27. *Alsike*.—July 14, 1910 : A good take. Oct. 25, 1911 : Quite the best clover plot. May 5, 1912 : Thin and patchy. Sept. 18, 1912 : Poor.
28. *Lotus corniculatus*.—July 14, 1910 : Fair take ; little growth. May 5, 1912 : Starting from seed again ; fear sheep will eat same out. Sept. 18, 1912 : Poor.
29. *Lotus major*.—July 14, 1910 : Very good take ; not made much growth. Oct. 25, 1911 : Patchy. May 5, 1912 : Hardly any visible this time of year. Sept. 18, 1912 : Poor.
30. *Lotus angustissimus*.—July 14, 1910 : Very good take ; not much growth yet. Oct. 25, 1911 : Dry weather and stock grazing on plots appear to check this. May 5, 1912 : More of this visible than either of the other *Lotus* varieties ; patchy, but appears persistent. Sept. 18, 1912 : Poor.
31. *Chicory*.—July 14, 1910 : Hardly any visible. Oct. 25, 1911 : Very patchy ; no growth made. Sept. 18, 1912 : Poor.
32. *Strawberry Clover*.—May 5, 1912 : Apparently absent.
33. *Lotus hispidus*.—July 14, 1910 : Fair take ; sown later than others. May 5, 1912 : Patchy ; stock grazing on young plants when sown pure pull a lot of it up. Sown in mixed pastures, the protection afforded by the other grasses shelter the young seedlings. Sept. 18, 1912 : Poor.
34. *Rhenish Festuca elatior*.—July 14, 1910 : Rather thin take ; fair growth made. Oct. 25, 1911 : Very fair sward formed ; stock have kept it well down. May 5, 1912 : Has been close grazed and looks healthy. Sept. 18, 1912 : Very good. Nice sort of grass.

ON "TUTIRA," THE PROPERTY OF MR. W. GUTHRIE-SMITH, PETANE, HAWKE'S BAY.

The seeds were sown in February, 1911. According to the original plan the area of most of the plots was one-eighth acre, except with rare varieties, when the area was restricted to much smaller plots. The land used had been in small tea-tree, and 1 cwt. bonedust per acre was the only manure used. The seed in each case was mixed with the quantity of bonedust required for the plot, and sown broadcast. All plots were treated alike and sown under like conditions.

The land selected, says Mr. Guthrie-Smith in his report, is "a fair sample of our light fern country. The only thing that will trouble us in the plots will be sorrel, which is bound to appear ; but we want to find out what seeds will overcome such things and thrive, otherwise they would be useless for this land."

Mr. Guthrie-Smith thus describes the land on which the grasses were sown : "It is light and dry. Several centuries ago many hundred thousand acres of this type of country in Hawke's Bay have been under forest, and at a later date in fern, and now grows stunted fern and low manuka. There is a varying depth of humus, then a layer of pumice, then water-deposited fine chocolate pumice. These soils lie on conglomerate and sandstone rock formations. Generally speaking, the seeds germinated very well ; but frosts, which raise the young plants, and violent rainstorms, which wash away the soil, proved fatal to many. Cold nights in winter, too, accounted for some such as *Paspalum stoloniferum*."

Danthonia semiannularis and *pilosa*.—Both germinated well, and were doing well in middle of May, and now are certainly thriving and have proved suitable.

Chewing's Fescue.—Germination excellent ; a grass excellently adapted to these soils.

Rat-tail.—Germinated badly ; was largely pulled out by stock owing to the toughness of the foliage, and the fact that the grass had not taken sufficient hold ; will survive and take possession of its plot. I believe this to be a very useful species for our second- or third-class country.

Agrostis vulgaris (Red-top).—Germinated well ; made good growth ; not liked either by hares or sheep ; have one patch on high range untouched by sheep for years.

Agrostis stolonifera (Fiorin).—Germination moderate ; plants strong ; in May green and good. I notice on my lands it is closely bitten down, more so than either of the danthonias. On light country of this type I intend to use it largely. An enormous number of seeds go to the pound, and the price is moderate.

- Cocksfoot*.—Germination excellent; a first-rate grass; grows on this type of land rather too much on the surface.
- Meadow Foxtail*.—A grass that surprised us. Germination excellent; stooling well in May; good roots; so far has certainly done well.
- Rhenish Festuca elatior*.—Germination good, and plants no doubt permanent; but so far, shilling for shilling spent on this or fiorin or crested dogtail, consider the two latter the best investment.
- Paspalum dilatatum*.—Germinated well, but late; undoubtedly a grass that will hold; although frosted in winter, throws good feed in summer, autumn, and early spring.
- Rye-corn*.—Made great growth; germinated well, and in spite of hares grew quite a crop.
- Crested Dogtail*.—For this type of land is perhaps the very best grass of all; germination good; by July a deep vivid green. Think very highly of it.
- Lotus angustissimus*.—Germinated slowly but strongly, and by May had come on well.
- Lotus hispidus*.—Certainly done well; stands heavy stocking; seeds itself freely; makes a good mat on the ground.
- Burnet*.—Germination good; a plant come to stop; very deep roots rapidly developed; seeds freely.
- Sheep's Parsley*.—Surviving and looking well.
- Cow-grass*.—Does splendidly here.
- White Clover*.—Does splendidly here.
- Italian Rye*.—Died out almost at once.
- Lespedeza striata*.—Came well; was much raised from the ground by frost, and finally succumbed to the heavy north-west storms.
- Prairie*.—Died out.
- Eragrostis Brownii*.—Only a few plants survived.
- Poa pratensis*.—A valuable grass in this country; have known it for many years here.
- Mitchell-grass*.—Did no good.
- Phalaris bulbosa*.—Perished first winter.
- Suckling Clover*.—Is of immense value in this class of country.

Under "General remarks," Mr. Guthrie-Smith observes on these light soils: "Rye-grass and prairie at once fail. Certain clovers thrive excellently, and, judging from the growth made by Scotch tares, peas might succeed. Cow-grass, white or crimson clover all do well, and last for many years."

ARTESIAN WATER IN CENTRAL OTAGO.

In sinking a well at the Department's poison depot, at Ranfurly, Central Otago, an artesian supply, flowing at the rate of 2,000 gallons a day, was struck at 18 ft. This is said to be the first artesian water-supply obtained in Central Otago. If, as seems reasonable to suppose, artesian water can be as readily secured in other parts of the district, the economic importance of the discovery will be enormous. A confirmative fact is that the Rev. Mr. Mason has located several places in the same district where, he says, there are good underground supplies of water.

The s.s. "Otaki," which sailed from Lyttelton for London on the 6th instant, loaded at Waitara, for the Imperial garrison at Gibraltar, 752 quarters of beef and 1,133 carcasses mutton. The "Otaki" also loaded at Waitara for London 438 carcasses of pork. This is the first shipment of pork from New Zealand of any consequence since June, 1912.

PASTURES AND CROPS.

DECEMBER.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month:—

WHANGAREI.—There has not been an inch of rain in the last two months. Consequently there is a lack of feed all over the north. Should the weather continue dry, as it gives every appearance of doing, it will be serious for the farmer. *Paspalum* is the only green feed, and undoubtedly in a drought it is at its best. Nearly all the oat crops are harvested and in most cases are turning out considerably better than was expected.—*A. P. Speedy.*

OPOTIKI.—December was exceptionally dry. Rain is badly needed now for the maize crops, which are very backward. Some very inferior crops are to be seen about the district. In several instances crops had to be resown on account of the continuous rains during the time of planting. In some instances the crops have been affected by the grub. Harvesting operations have just commenced, and farmers are making the most of the present dry weather. Potatoes throughout the district are more or less affected by blight.—*J. Case.*

AUCKLAND.—The month just ended, from a farmer's point of view, was all that could be desired. Crops have been harvested in splendid condition. The fine weather encouraged the settlers to work early and late to get in their crops before a further break in the weather. No doubt everything is drying up, and rain is much needed to give new life to the pastures and other crops. Stock of all descriptions are looking well at present, and prices ruling for both fat stock and dairy cows are very high compared with late years.—*R. Rowan.*

TE AROHA.—Excellent weather was experienced in December, with two light falls of rain. Root crops are already sown and require moisture, but the majority of farmers are waiting for rain before sowing turnips, &c. There are good crops of hay and oats, being also free of rust, &c. Harvesting is in full swing. With the absence of heavy rains excellent hay and oats will be stocked. The butter-fat output has dropped a little, but a nice fall of rain will bring it to a normal plane.—*J. L. Morris.*

HAMILTON.—A few light rains in the early part of the month, hot dry weather during the remainder, with warm breezes which are rapidly drying up the pastures, was the experience in December. Grain crops are looking well, and there is every prospect of a good harvest. Stock are in good health and condition, and the season has been particularly good for dairy herds up to the present. Prices for all classes of stock are easier, and should the dry weather continue will fall lower.—*J. Kerr.*

CAMBRIDGE.—The weather for December was warm and dry, with no wind to speak of, and practically no rain. Haymaking is in full swing and is being got in in good condition. Oats are also being harvested, and, on the whole, the crops are very good. Potato crops are looking healthy, very little blight being reported. Pastures throughout the district are good.—*A. A. Clapcott.*

TE AWAMUTU.—December was an exceptionally warm month, and, following on a wet spring, the result was abundance of feed for stock. Hay is in good supply, and in most instances is cut and in the stack. There has not been so much oats sown this year, but crops are looking well and are quickly ripening. Turnips are again being sown in large areas, and should rain come soon a good take should result. Stock in general are looking well, but there has been a slight slump in prices. A much better month for the dairyman than December of 1911.—*C. E. McPhee.*

TE KUITI.—The most seasonable conditions were experienced in December—ideal summer weather in every respect. To these favourable climatic conditions pastures have been responsive by showing good growth, with a hardening tendency, thus giving

more sustenance and fattening qualities. Many settlers with bush to burn are already taking advantage of the dry conditions by burning off; but it is a query whether it would not have paid those burning now to have waited until next month, or even later, and made sure of good results.—*B. Bayly*.

OHAKUNE.—With the exception of a couple of days early in the month ideal weather prevailed during December; consequently the district throughout is looking exceptionally well, and all branches of farming are flourishing. Cereals are progressing satisfactorily, and are showing signs of the kindliness of the summer sun tempered with a sufficient quantum of moisture. Root crops are in a particularly healthy condition, and the plots grown in co-operation with the Department are proving that this district has a big future as a dairying centre. The weather has been very favourable for shearing, and the clip has been above the standard both in quantity and quality. The sheep, too, are coming off the shears in good condition. The outlook is most encouraging.—*P. Barry*.

NEW PLYMOUTH.—Very heavy rain fell on the 4th. From that date to the end of the month the weather has been exceptionally fine, with cool nights. Grass has made good growth and feed has been plentiful. Both mangels and turnips have in some cases been attacked by the fly, but on the whole are doing well. Haymaking and ensilage-making are general. Owing to the dry weather cows are shrinking in their milk. A good shower of rain would be much appreciated.—*R. E. Fairfax-Cholmeley*.

STRATFORD.—It has been a splendid growing month, with fine warm days. All crops have come on well. The spell of fine weather was very favourable for shearing, and is also good for haymaking. Many of the settlers have burnt their bush, and good burns are reported. The turnips would do with some rain to give them a start.—*Austin F. Wilson*.

HAWERA.—The first week of the month was unsettled, but the conditions suddenly changed, and it was realized that summer had set in in earnest, warm dry weather prevailing throughout the remainder of the month. At time of writing rain would be acceptable to bring along young root and green crops, freshen up pastures, and prevent the rapid falling-off in the milk-supply which invariably results from a dry spell. Farmers, however, have availed themselves of the opportunity to progress with haymaking, which is now well advanced.—*A. J. Glasson*.

WANGANUI.—After nearly fourteen months of more or less unsatisfactory weather, of which rain and cold were predominant features, fine weather set in in the beginning of December, since when we have had a wealth of warm sunshine with very little rain. Unfortunately, the wind which has been much in evidence has evaporated surface moisture and made more rain a necessity to the success of late-sown cereal crops, also to grain and root crops. Early-sown grain crops and feed in pastures have grown luxuriantly during the month and are now looking remarkably well.—*C. Watson*.

GISBORNE.—The weather during December was hot and fairly dry. This has given farmers a good chance to get on with their shearing. Pastures are abundant, and a good area is being cut for hay. Rye-grass promises a good yield. Oats are being harvested in fine condition. Barley is good. Maize is now making a capital show, and the hot weather has given a good opportunity to deal with weeds amongst the maize.—*William Ross*.

HASTINGS.—Throughout December the weather was very seasonable. Harvesting operations were in full swing, and much good fodder should be saved, as the crops appear to be much better than usual in this district. There is still an abundance of grass, which is now of better quality for fattening purposes than earlier in the season. Potato crops are good, but in some places are becoming much affected with blight; other root crops are looking well, but will soon require rain.—*J. G. Parker*.

WAIPIKURAU.—The weather in December was very dry and hot, causing pastures on high land to brown up considerably. Rape and all late crops are in need of rain.—*H. O. M. Christie*.

FIELDING.—The weather for the past month was seasonable, although rain would be gladly welcomed in moving the rape and turnip crops along. In some instances the stock are getting short of water. Some fine hay is being made. This will be found useful during the winter months to keep the stock in good form for the coming spring. Shearing operations have been in full swing.—*William Dibble*.

PAHIATUA.—The weather in December was distinctly of a summer character. The heavy lands have become baked through lack of intermittent showers, and the quantity of milk went down through the same cause. We have not the quantity of feed there

ought to be at this time of the year. Showers are wanted to give rape and turnips a start. Hay is being got in in good order. Early crops are ripening, but late crops are poor. Shearing is now finished. Rainfall for month, 0.75 in., rain falling on six days. Rainfall in December, 1911, 7.64 in., rain falling on twenty-one days.—*T. Bacon*.

MASTERTON.—The fine seasonable weather experienced during December has enabled good progress to be made with all kinds of farm and station work. Shearing operations except in a few instances have finished, and in some cases lambs have been dipped as a prevention against the maggot-fly. Grass is more plentiful here this season than it has been for some years past, and some very heavy crops of hay are being harvested. Potatoes are looking extremely well. A very marked improvement in the state of all crops has taken place since the dry weather has set in, and a good yield is now anticipated. Oats in many cases are now being harvested. On the 19th a windstorm of unusual fury visited this district and did considerable damage to orchards and gardens. Fat stock are becoming very plentiful. There has been a good clip of wool, but it is very light in condition.—*T. C. Webb*.

CARTERTON.—The weather for the month was exceptionally good, there having been ten fine warm sunny days straight off, which enabled many farmers to get in their hay crops, which are exceptionally good. On the 18th and 19th a south-east wind blew with hurricane force, doing great damage to the orchards, the hay that was cut being scattered far and wide. Since then we have had showers which will benefit the green crops. Early sown-out crops are looking well.—*S. C. Ivens*.

BLenheim.—The weather was very hot all the month, and rain is badly needed for the crops on the heavy land, which were very late in being put in owing to the sodden state of the ground in spring. The gale of yesterday did a certain amount of damage to both crops and orchards.—*F. H. Brittain*.

SEDDON.—Ideal harvesting weather continued all through December, and the farmers have been very busy. All crops are practically cut, and all the oats are stacked. Threshing is being actively carried on in barley-paddocks. The pea crops are nearly all harvested. The increase in acreage of this particular crop is about 100 per cent. over that of last year. The north-westerly winds, so dreaded by settlers, have been conspicuous by their absence. Pastures are beginning to dry up.—*E. T. Sinclair*.

NELSON.—Very little rain has fallen during the month, and the country is too dry. The pastures have gone very brown, and some of the corn crops have ripened too quickly; they wanted rain to fill the grain better. The potatoes and other root crops also show the want of rain. Although some farmers are harvesting, a good rain would do a great amount of good.—*Gilbert Ward*.

HOKITIKA.—The weather throughout December has been changeable. After being favoured with several hot and sunny days about the middle of the month, it turned quite wintry again, with falls of snow on the high country. The rainfall registered to date (28th instant) has been 2.6 in. Farmers have been hampered considerably with their agricultural pursuits in consequence. The fruit crop has also suffered considerably, and by present appearances will be a very light one this season. When dealing with co-operative experiments last week I inspected a very promising crop of lucerne on the farm of Mr. H. Linklater, of Waitaha Settlement. There is another good lucerne-plot on Mr. Crowe's farm, at Te Kinga. Both crops are showing up strong and healthy-looking, and there is every possibility of lucerne doing well on the West Coast if care is taken in getting the ground in good order before sowing the seed.—*H. J. Walton*.

ROTHERHAM.—The weather for the month of December was exceptionally dry, and farmers are now hoping for rain, which is badly needed for filling the grain and to freshen up the green crops and pastures. These are now beginning to suffer on account of so many warm winds. Harvesting has commenced in several parts of the district, and should we get rain shortly the yields should be highly satisfactory. Shearing is now in full swing on all of the back-country stations, and if this weather continues for another fortnight this work will be almost completed. Root crops generally are very good in this district, and I have not so far heard of any diseases affecting them.—*W. M. Munro*.

RANGIORA.—December has been a warm bright month and has brought forward the backward crops considerably. On the other side of Porter's Pass feed is very plentiful, and the crops, although looking very strong and healthy, are backward; but there is every prospect of a good harvest. The first mustering was in full swing when I was there. The percentage of lambs was very satisfactory in the back country.—*A. Hughes*.

LINCOLN.—Throughout the month seasonable weather prevailed. Under its influence early crops of oats and barley ripened quickly, and wheat crops were greatly benefited. Rye-grass crops came on rapidly. Cocksfoot crops are well headed and present a fine appearance. Rape is looking well. During the month the hay crops were safely stacked. Grass is still abundant, and stock of all kinds are in splendid condition.—*J. G. Scott.*

TIMARU.—The weather was very unsettled all the month, heavy north-west winds with cold south-west rain and great heat being experienced. A warm rain is badly wanted. A lot of the potato crops have suffered from the weather and do not promise as good a crop as expected. Grass-seed crops are better than have been known for years.—*J. C. Huddleston.*

FAIRLIE.—Very warm weather was experienced during the month. This brought the crops on and ripened the grass-seed. Harvesting will commence about the middle of January. There is every promise of a heavy yield of all crops. Potatoes are looking exceptionally well. I have heard no complaints of blight. A large area of swedes and mangels has been sown and these are doing very well. From present appearances this promises to be the best season the farmers have had for many years.—*W. B. Manning.*

WAIMATE.—The weather during December was more propitious for agricultural and pastoral pursuits. Cereal crops on the whole cannot be said to be looking so well as at same period of last season. Pastures are particularly good, and there is grass in abundance. It is particularly noticeable that haymaking has been very general, and has occupied the farmer's attention more than usual. Potatoes on lands more subject to floods had in cases to be planted a second time. A considerable area is under this crop, which on the whole presents a healthy appearance. Mangels, rape, and turnips occupy a considerable area. Much of it has been late sown. Plants above the ground appear healthy. Lucerne is somewhat retarded in growth, but the improved weather-conditions are conducive for the better growth of this valuable forage plant. Co-operative experimental areas on the whole showing good growth. Stock of all kinds have seldom looked better, and it is anticipated that the number of fat lambs sold straight off their mothers will be greater than usual this season.—*F. A. Macdonald.*

KUROW.—We had very mixed weather during December, one week being hot enough for the tropics and the next cold enough for winter, with slight snow-showers on the high country. The cold weather is proving very severe on machine-shorn sheep, but there is no serious loss so far. Nearly every shearing-shed on the Waitaki is now equipped with machine-shears, and blade-shearing is becoming a thing of the past. A noticeable result of the recent wet spring experienced in this locality is the beautiful show of white clover in all the pastures. Farmers are taking advantage of the abundant supply of grass, and are busy making hay for winter fodder. Potato crops look healthy and give promise of heavy yields.—*G. Reid.*

OAMARU.—The weather this month has been very warm, with one or two heavy showers. This has caused a certain amount of the soil to become baked on the surface. Farmers are anxious for a good twenty-four hours' steady rain. The early crops are everywhere looking exceedingly well, but those later sown are in nothing like the order of the earlier-sown varieties and give signs of a very light return.—*W. F. Flower.*

PALMERSTON SOUTH.—The weather during the month was warm and dry. Rain was experienced along the coast on the 19th, 20th, and 21st, with a coating of snow on ranges at the same time. Pastures are very good—in fact, were never known to be better. Crops are far below last season's standard; the continuous wet in the spring having an ill effect on them. Root crops are not all sown yet. A good day's rain is much needed for pastures and all crops.—*C. S. Dalgliesh.*

NASEBY.—Up to the 17th the weather was steady, and fair heat was experienced. On the 18th to the 21st boisterous winds were accompanied by rain. On the 20th there was a good snowstorm lasting from 5 o'clock in the morning till about 7. During the two hours' fall it was very cold, causing a slight loss amongst the newly shorn sheep. The wool-clip this year is very good. Lambs are also looking well and should command a good price.—*A. T. N. Simpson.*

CLYDE.—The weather during December was much warmer than that of the previous month. Snow fell about the middle of the month on the high country, but did not lie very long. The country is getting practically burnt up, and rain is wanted badly.—*Thomas N. Baxter.*

DUNEDIN.—The weather for December was warm, with just enough rain to keep the ground from getting too hard. Owing to spring rains the ploughed land has a very

hard surface. The oat crops are somewhat backward. Turnips are looking promising and will soon be ready for thinning. Potatoes promise fairly well. The hay crops are heavy, and there is an abundance of feed everywhere. The grazing-country just now is remarkably good.—*J. R. Renton.*

MOSGIEL.—The month of December was good. Warm rain fell on four days, and all kinds of crops are looking well. Turnip-thinning is general, but labour for this kind of work is very scarce. Farmers are taking advantage of the fine weather for cutting the hay crop. There will be a record yield this season.—*H. McLeod.*

LAWRENCE.—The weather for the month was very warm. Drying winds were also experienced. These have kept the ground hard. Consequently crops are not making good progress, and have every appearance of being light. Shearing is almost completed.—*R. Barron.*

BALCLUTHA.—The weather for the month of December was all that could be desired from a farmer's point of view. Rain fell on ten days, the heaviest fall being on the 16th, the total rainfall for the month being 122 points. The grain crops are looking very well, but are going back slightly owing to the continued dry spell. Shearing is practically over. Turnip crops are doing well, but are a bit late. Harvest also promises to be late this season.—*Hugh A. Munro.*

OWAKA.—December was a good month, very warm weather having been experienced, and the crops have come on well. Small birds have done a great deal of damage to the turnip crops, in some instances having pulled up all the young plants as they came through the ground. Hay crops are ready for cutting, and cocksfoot is very heavy and should give a splendid return. Early potatoes are now being dug, and there are some very good yields.—*R. McGillivray.*

GORE.—During the past month the weather was more favourable, and crops and pastures came away well. Turnips are not all sown yet, but those sown earlier are looking well, and thinning is now being done. Blight* is fairly prevalent in the Californian thistles this year, and several farmers have told me of patches having died out. They attribute this to the blight.—*B. Grant.*

INVERCARGILL.—December was a good month for the farming community. There were frequent showers with nice warm sunny days. Grass, grain crops, and turnips have made good growth. Although the grain crops are perhaps a little on the short side, taken on the whole they are looking fairly well, and, given good weather until after harvest, the yields should be good.—*J. R. Whyborn.*

OTAUTAU.—The weather for the month was dry and warm, with the exception of a few days which were very cold. Crops are not looking so well as in previous years, though in some cases a good yield may be expected. Grass-seed is not so heavy as last year, which is an advantage. Turnips that are up are looking well. Some are still unsown. Potatoes are not looking well.—*H. F. Dencker.*

LUMSDEN.—The weather in December was very good—warm with some fine showers of rain. We were all glad to see it, as the surface of the ground was getting very hard and caked. Good progress has been made with the turnip-sowing, and from all appearances turnips should be plentiful next season. Oats and wheat crops are comparatively light compared with last year, on account of the lateness of the season. There is abundance of feed in the pastures. Sunshine and warmth, with occasional showers, are causing everybody to forget the very unsettled conditions which have been in evidence for so long.—*W. S. S. Cantrell.*

QUEENSTOWN.—The month of December was very dry, practically no rain falling in some parts of this district. Crops, pastures, &c., are considerably behind what was expected of them. Turnip crops are somewhat of a failure, some having been sown three times.—*A. Clarke.*

PEMBROKE.—Southerly gales raged about the 18th and 19th instants, terminating with several showers of rain and a light coating of snow on the high country. Since then the weather has been exceptionally warm and dry, and the country generally is badly in need of rain. Shearing is progressing steadily, and the clip in general is very satisfactory from all points of view. The lambing, except in few cases, is not up to the usual standard.—*J. A. Griffith.*

* This disease will in all probability be the thistle-rust (*Puccinia rupestris*), a fungus that is now widespread and certainly considerably lessens the vitality of Californian thistle, but, unfortunately, never appears in a sufficiently epidemic form to bring about any radical diminution of the pest.—*A. H. COCKAYNE*

THE FRUIT CROP.

THE Officers of the Orchards, Gardens, and Apiaries Division report as follows regarding orchard conditions for the month of December :—

WHANGAREI.—December was hot and very dry throughout, practically no rain having fallen during the month. Consequently the fruit crop in most localities was considerably affected. For all classes of fruit rain is much needed. Perhaps strawberries are the most affected, and only those on the volcanic soil are keeping up anything of a supply. Peaches are failing rather badly, more especially the freestone varieties. Bronze beetle has done considerable damage throughout the district. The first week of the month brought in Sneed's and Evans' Early in good supply, also Bell's November, followed closely by High's Early and Jargonelle pears.—*J. W. Collard.*

AUCKLAND NORTH.—The weather was fairly dry and warm throughout December. Peaches and plums came forward in fair quantities. Prices ruled good. American apples are still in evidence. Lemons are scarce. Tomatoes are in good supply and prices are good. Strawberries are feeling the effect of dry weather. Very short season unless rain falls soon.—*W. C. Thompson.*

AUCKLAND SOUTH.—With the exception of two days at the beginning of the month December weather was the best experienced here for some time, being free from winds and heavy rains. Where no cultivation has been made the apricots and other early fruit are feeling the effects of the continual dry spell, and a good many are falling or ripening prematurely; but where the ground has been well tilled the moisture has been retained and the dropping is not nearly so noticeable. Tomatoes and potatoes are still looking well, being very free from blight, which is not nearly so prevalent this year. Early apples are being sent to market, the first reaching the retailer early this month. Codlin-moth is very bad where spraying has not been carried out, it being difficult to convince some growers (a small percentage) of the benefits derived from it. The silver-blight is very bad among the English plums, and considerable damage is being thereby caused.—*N. R. Pierce.*

HAMILTON.—Hot, dry weather prevailed throughout December. Orchards on clay soil where spring cultivation was neglected are drying out rapidly. Early plums and peaches are coming on to the markets in fair supply, but prices realized are hardly up to expectations. The codlin-moth is on the wing in very large numbers in many districts, and growers will need to pay every attention to the arsenate-of-lead sprayings.—*T. E. Rodda.*

POVERTY BAY.—The greater part of the month was hot and dry following on a week's heavy rain in the end of November, which caused a certain amount of splitting of early apricots and cherries. A heavy wind in the middle of the month also caused some of the fruit to drop in exposed positions. The Gisborne market was well supplied with early fruit. Apricots, peaches, and plums were on the market the first week in December. Growers report that fungus diseases and insect pests are very troublesome this season.—*W. R. L. Williams.*

WANGANUI.—Plums (Evans' Early and cherry-plums) in full supply. Crops of plums, peaches, apricots, apples, and pears are maturing well where they have received proper attention. Where this is not the case growers find a large proportion of their half-developed crop on the ground, and wonder why this is so.—*W. C. Hyde.*

MANAWATU AND WAIRARAPA.—The month ended fairly well for the fruit industry. There is only a medium crop of fruits in general. Apples and pears are well advanced, but large quantities not marketable owing to black-spot. Good samples of local peaches were on the market towards the end of the month.—*G. Stratford.*

HASTINGS.—Fruitgrowers here are now working at high pressure with every prospect of a profitable season before them, although their annual troubles are more or less in evidence. Early peaches are coming forward freely, but despite thinning they are rather smaller than usual, owing to the cold weather of early summer. Several varieties of apples are falling rather badly, the trouble being mainly with young trees. The

black-currant and raspberry crops are good and are bringing satisfactory prices, but many growers are having difficulty in getting pickers. In many cases early-planted outdoor tomatoes have failed to set fruit, but later crops are satisfactory. Fungus diseases, excepting Irish blight, have caused much trouble. The lime-sulphur spray on the whole has proved unsatisfactory through damage to foliage, in some instances scorching very badly. The brown beetle has done an unusual amount of damage throughout the district to peach and other foliage.—*J. A. Campbell.*

WELLINGTON.—During December the weather was all that could be desired. Orchard work is being pushed ahead, and spraying, thinning-out, and digging are being attended to. I anticipate a good crop of pears from the Paraparaumu district. Silver-blight and bronze beetle are in some places causing a great deal of annoyance. Potatoes are fairly plentiful and showing good tubers. I have noticed Irish blight on a few lots. Plums are ripening splendidly, and large supplies are on the market.—*T. C. Webb.*

NELSON.—December was dry and hot, and fruit ripened very fast. The raspberry crop is badly in need of rain. The hot weather has been very favourable to the codlin-moth, which are about in good numbers. Growers are busy spraying for this pest with arsenate of lead, in many cases combining it with Bordeaux mixture for the control of black-spot. Now the fruit is well forward one can judge the prospects of the crop better. In apples Jonathan and Sturmer Pippin are good, but the latter variety seems to have been especially singled out for attack by the black-spot, though a good many other varieties have a fair share of it. Munroe's Favourite, Five Crown, and Cox's Orange are only a medium crop. Other kinds are fair to good. Some hundreds of cases have been cut off by the use of lime-sulphur sprays. The trees so damaged are putting out new leaves. In pears Williams's Bon Chretien seem to be about the best. Other kinds are only a medium crop, and in most orchards show a good percentage of black-spot. Apricots are very light. Peaches and plums are only medium crops. Outside tomatoes are in need of rain, while those in the houses in some instances are badly blighted.—*J. H. Thorp.*

CHRISTCHURCH.—The weather was much more seasonable during the past month, but owing to the very boisterous weather during the end of October and greater part of November fruit dropped rather more than I expected. Still, I anticipate a good all-round crop. Raspberries, gooseberries, and currants have been coming in very freely during the last fortnight. Good crops of these are assured. Cherries are almost over. A moderate crop was harvested. The first local peaches of this season were on the market last week.—*W. J. Courtier.*

TIMARU.—The weather has been favourable for the growth and development of black-spot, being cold and foggy, alternating with hot, muggy winds. Silver-blight is much in evidence, especially so in apricots, peaches, and plums. Strawberries and cherries are realizing good prices, and supplies are plentiful. Spraying with arsenate of lead for the prevention and control of codlin-moth and pear-slug is general.—*A. B. Mansfield.*

DUNEDIN.—Raspberries have been very plentiful. Strawberries are nearly over, and the same remark applies to cherries. A few early peaches have been picked, and other fruits are looking well. Vegetables are generally good. Peach-curl and die-back fungus are much in evidence this year, especially where fungicidal spraying has been neglected.—*W. T. Goodwin.*

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of December :—

AUCKLAND.—Good supplies of locally grown fruit have been placed on the market—viz., strawberries, peaches, plums, loquats, grapes, apricots, and raspberries. A few consignments of apples and pears came forward, but were of rather poor quality. Apples realized from 3s. to 3s. 9d. per bushel case, and pears averaged about 7s. Straw

berries ranged in price from 6d. to 1s. 3d. The packing and grading methods adopted by the majority of growers leaves much to be desired.—*C. Craigie*.

WELLINGTON.—The markets were very busy in December, large quantities of local fruit coming to hand. Cooking-apples realized from 6s. 6d. to 7s. 6d. per case. Peaches were in good supply, prices ranging from 5s. to 6s. 6d. per case. Prices, however, dropped towards end of month, owing to heavy oversea shipments, amounts realized for locally grown peaches being 2s. 6d. to 4s. 6d. Strawberries were in heavy supply, selling at 7d. to 1s. per pound. Tomatoes, in fair supply, realized 1s. to 1s. 2d. per pound. The packing of tomatoes in many cases was very bad. Apricots brought 7s. to 8s. 6d. per case. Plums, dessert 4s. to 5s. 6d., cooking ditto 2s. to 3s. 6d., per half-case. Gooseberries, 2s. 3d. to 3s. per half-case. Raspberries, in good supply, brought from 5s. to 6s. 6d. per bucket. Red currants, 5s. to 7s. per half-case. Black currants, 8s. per half-case. Cherries, 4s. to 5s. 6d. per half-case. Vegetables were in good supply and realized satisfactory prices on the whole.—*T. C. Webb*.

CHRISTCHURCH.—Small fruits were in fair supply, but were of good quality. A few lines of this season's peaches and plums were on sale and realized good prices. Hot-house tomatoes were offering in fair quantity. Vegetables were in fair supply, especially potatoes and peas.—*E. A. Reid*.

DUNEDIN.—Good supplies of cherries and strawberries have been coming forward, the quality being very good. The supply of gooseberries, tomatoes, and black currants has not been so heavy as the supply of strawberries and cherries, but still the market has been well supplied with these fruits. Small lines of asparagus, new potatoes, green peas, turnips, and lettuce are also coming to hand.—*E. T. Taylor*.

BLUFF.—The majority of fruit inspected was imported. Strawberries were to hand chiefly from Waimate, Roxburgh, and Alexandra. Tomatoes from Nelson and Canterbury were opened up here in good condition.—*R. Hutton*.

HONEY-CROP PROSPECTS.

THE Director of Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—December has been an ideal month for beekeepers—white clover plentiful, and fine hot days. Honey has been coming in freely. Around Auckland it is getting rather dry, but the weather is now appearing to break, and should we get a good rain and then fine weather the yield of honey should be a record.—*G. V. Westbrooke*.

WELLINGTON.—Owing to the favourable weather that has been experienced in the Wellington, Hawke's Bay, and Taranaki Districts the prospects of a fair honey crop have materially improved.—*F. A. Jacobsen*.

CHRISTCHURCH.—Recent rain has refreshed pastures. Should suitable weather follow there is every prospect of a record honey crop in Canterbury. Honey is of excellent quality generally, owing to abundance of white clover. Many beekeepers are extracting to relieve the congested condition of the hives, as an extended flow of nectar from clover is anticipated.—*L. Bowman*.

DUNEDIN.—The prospects of a good honey crop are excellent. The spell of warm weather lately experienced has improved the growth of the clover, and there are now indications that a good average honey crop will be harvested.—*E. A. Earp*.

According to the London *Times* a strain of bees harmless to handle has been successfully hived by Mr. Burrows, of Loughton, Essex. The bees, which have been obtained by mating a Cyprian drone with an Italian queen, are very active workers, and Mr. Burrows claims that they are less liable to disease than the ordinary English bees. The new bees are not stingless, but the sting is innocuous. One hive this year yielded over 200 lb. of honey.

THE WEATHER.

DISTRICT NOTES FOR DECEMBER.

D. C. BATES.

Chiefly from Telegraphic Reports.

District.

- 1, 6. Fine but unusually dry weather prevailed, the total rainfall being below the average by about 70 per cent. Warm seasonable temperatures ruled, the mean being about the usual for December.
- 7, 8. Usually about 90 per cent. less than the average rain fell, few stations recording "nil" for the month. Warm northerly and westerly winds predominated, generally with but little force, but strong southerlies prevailed with cool conditions on the 22nd and 23rd.
- 9, 10. Fair to cloudy weather ruled, and the rainfall was 75 per cent. below the average. The month was usually free from strong winds except on the 19th, on which day a heavy westerly gale was experienced at most stations. This was followed by a cool southerly on the 21st and 22nd. Between the 5th and 10th conditions were extremely warm and sultry, and the mean temperature was generally slightly in excess of the average for December.
- 11, 12. The rainfall was deficient in these districts, the departure from normal being greater in the north than further south, and ranging from 90 per cent. to about 25 per cent. The heaviest fall occurred on the 19th, generally when a strong north-west wind was experienced. Fair weather predominated.
13. About 90 per cent. less than the usual rain fell. Fine, warm, and at times sultry weather was the feature of the month.
14. What rain there was mostly fell between the 15th and 20th of the month, but the total was everywhere less than the average by from 50 to 60 per cent. A north-west gale was experienced on the 19th, otherwise the wind was not more than the average force for December. Mild and fair weather predominated.
15. Precipitation was only about half the average, dry north-west winds prevailing during the month, generally with but little force except on the 19th, when a heavy gale was experienced. From the 1st to the 5th and from the 18th to the 21st were rain-days, the remainder of the month generally being fair. A thunderstorm occurred on the 20th, and foggy mornings were frequent.
16. Fair weather prevailed. Rain fell in the beginning and the middle of the month, the total showing 50 per cent. less than the usual fall for December. From the 16th to the 20th the weather was boisterous.
17. The weather was fair, warm, and very dry, less than half the usual fall being recorded, and at some stations the deficiency was much more. A north-west gale with heavy showers occurred on the 19th.
18. The rainfall was below the average in all these districts, the deficiency averaging about 52 per cent. Some hot and dry north-west winds were experienced, and a heavy north-west gale on the 19th. On the 20th thunderstorms occurred in many parts with the change of wind to the south. In the early part and again between the 18th and 22nd the weather was dull and unsettled. The remainder of the month proved fine.
- 19, 24. Strong westerly winds prevailed, and dull weather with showers was frequent, interspersed with some fine and warm days. Conditions were stormy on the 19th, on which day the maximum rainfall for the month was recorded at most stations. The total rainfall was about the average, in some cases slightly above, and in others slightly below.

SUMMARY.

The weather during the greater part of the month was warm and fine. A small cyclone passed through Cook Strait on the 3rd. and westerly low pressure ruled between the 15th and 21st. On the morning of the 19th a reading of 28° 85" was recorded at the Bluff. Heavy westerly winds occurred on that date.



ANSWERS TO CORRESPONDENTS.

LATE HATCHING.

MR. A. MUELLER, Craigieburn, Canterbury, writes,—

What is the reason that chickens this season are in some cases two or three days late in being hatched? The shells of the eggs seemed too hard to break to let the chicks out.

The Live-stock and Meat Division replies,—

If the eggs were under a hen they were either stale when put down or the hen did not sit closely at first; if in an incubator, the temperature was too low, or the thermometer may have been incorrect or have been in a wrong position; again, sufficient moisture may not have been applied.

APIARY QUESTIONS.

MR. W. A. DAWSON, Fortrose, writes,—

1. The bee industry: What sort of willows are the honey-producers: is it the "weeping" willow? The other sort do not seem to form a great attraction for bees as far as I have seen.

2. Honey-capping: Here is a good way to get all the honey remaining out and use it to the best advantage. Place the cappings in a vessel and pour on warm water; stir up thoroughly and let soak a time, then drain through cheese-cloth, and squeeze the wax into balls to be melted. The liquid can be boiled for two hours, in case of foul-brood germs, or for twenty minutes, allowed to get cold, and then boiled for another twenty minutes, care being taken not to burn it in doing so. If too thin, a little sugar may be added when boiled. This can be fed to a strong colony for winter stores, and a watch can be kept to see no sign of foul-brood accompanies it.

3. Fertilization of fruit-blossoms: Is it so that for purposes of cross-fertilization particular species of fruit should be planted next to each other, that the pollen may be taken by bees or insects immediately from one to the other? If so, what sort of fruit would be of use for this purpose: for instance, would the pollen from Cleopatra be fertilizing to the blossoms of Gravenstein or any other kind, and so on, both being apples; also, would the pollen of one class of fruit fertilize any other sort?

The Orchards, Gardens, and Apiaries Division replies,—

(1.) Both the weeping willow and the common straight willow are of great value to bees in the spring. The flowers last for only a few days. They yield large quantities of pollen and a considerable quantity of white nectar suitable for brood-rearing. Willows do not flower every year.

(2.) A superior way of treating honey-cappings was given in a previous issue of this *Journal* (see April, 1912), but the method kindly described by you emphasizes the necessity for great caution in feeding back honey to bees, and would appeal strongly to those owning but a few colonies.

(3.) In order to secure the best results with several varieties of fruits it is necessary that cross-fertilization by bees or other insects should take place. The pollen of one class of fruit would not cross-fertilize another class of fruit. There are many varieties of apples in blossom at the same time as Gravenstein that would cross-fertilize with that variety, but I do not think it has yet been definitely proved that the pollen from Cleopatra would do so.

HORSE LOSES HAIR.

MR. R. DOUGLAS, Miranda, writes,—

I have a two-year-old filly, and all her tail-hair is coming out; also has blotches about her head. She has been running with about twenty other young ones, but they

all seem quite right. The mare in question has been in feed all along, and is now nice and fat, and is well in other respects. She does not seem to rub on posts, trees, &c., any more than the rest of the young ones.

The Live-stock and Meat Division replies,—

This is evidently a case where a personal examination is required before advice can be given as to what the condition really is, and its cause. From the fact that the rest of her mates are not affected, and no excessive amount of irritation is shown by the filly herself, it would appear that parasites are not the cause. It would have been more satisfactory if you had stated the condition of the skin itself where the hair is coming off—whether it is inflamed or not. If it is not, I think you had better make a scraping of the skin with a blunt knife. Put this scurf into a clean dry bottle and send it to the Officer-in-Charge, Veterinary Laboratory, Wallaceville, where it will be examined microscopically. Although it is not advisable to apply remedies without knowing the cause of the trouble, you can do no harm in this case by washing the parts with a 1-in-80 solution of any non-poisonous coal-tar dip.

BASIC SLAG.

MR. THOMAS BROWN, Woodville, writes,—

Will basic slag restore worn-out pasture, and what is the best way to apply it? Will grass take if surface-sown with the slag? The pasture has partly gone back to native grasses, and is overrun with daisies and other weeds. The land is too broken to plough, except in patches.

The Fields and Experimental Farms Division replies,—

Basic slag will not completely restore worn-out pasture, but will be a material help towards that end. The best way is to broadcast the manure at the rate of 4 cwt. or 5 cwt. per acre. Slag should be applied in late autumn or early winter. If land is of a light sandy nature, sulphate of potash, at the rate of 200 lb. or 300 lb. per acre, can be profitably applied in conjunction with slag. That mixture has been found beneficial. Grass-seed would be greatly benefited if surface-sown with slag. After sowing it will be advisable to keep stock off till the herbage has been washed by rain. There is said to be a possibility of stock being endangered by grazing on pasture so top-dressed.

TWITCH.

MR. C. J. HURST, Waimate, writes as follows :—

I shall be obliged if you will give instructions as to the eradication of twitch.

The Fields and Experimental Farms Division replies,—

Twitch is the name applied here to several grasses, as *Poa pratensis*, *Agrostis stolonifera*, and *Agropyron repens* (the true couch or twitch). There is but one means of eradication—i.e., cultivation during summer and the careful cleaning of crops. The *Poa* and the *Agrostis* can be controlled with less effort than can the true couch. More than one season will be necessary to effect the eradication of this persistent weed.

CHOU MOELLIËR.

MISS J. MACKAY, Sockburn, writes,—

Is the seed on untransplanted chou moellier fit for sowing? The seed was sown in April, and the plants are now in bloom.

The Fields and Experimental Farms Division replies,—

The seed of one-year-old plants is not considered desirable. To avoid this early flowering and seeding, transplantation is resorted to—that is, by delaying the flowering a more uniform crop for feeding is secured.

VEGETABLES.

"GARDENER," Pahiatua, writes,—

Will you kindly tell me through the *Journal* the time to sow the undermentioned vegetables so as to be able to exhibit them in an agricultural show in March: Beet, runner-beans, onions, peas, pumpkins, and potatoes.

The Orchards, Gardens, and Apiaries Division replies,—

For show purposes onions should be sown in the autumn; other vegetables in the spring, in well-drained thoroughly prepared soil.

MANGELS, ONIONS, AND CARROTS.

W. H., Templeton, writes,—

Would you please inform me through your *Journal* whether I can transplant the following: Mangels, onions, and carrots. I have an acre of each, and there are some bare patches, so will you please inform me if I can transplant, and when.

The Orchards, Gardens, and Apiaries Division replies as follows:—

Onions and mangels may be transplanted, but not carrots. Transplant in spring, selecting cool moist weather.

LUCERNE, LIME, ETC.

MR. GEORGE WALKER, Gisborne, writes,—

I have an acre of fairly rich alluvial flat on which I am desirous of trying lucerne, and I shall be glad of your advice as to how to proceed. The following is the present condition of the soil, which is inclined to run together, and I also have reason to suppose that it is deficient in lime. Three years ago the land was broken out of grass for the first time and sown in pumpkins with a little super, this crop being fed off on the ground. Last year it was planted in potatoes with 2 cwt. blood and bone, 2 cwt. super, and $\frac{1}{2}$ cwt. sulph. potash. As soon as the potatoes were out barley was sown with 2 cwt. basic slag. The barley was fed off, and this spring I ploughed it in, and put in mangels with $1\frac{1}{2}$ cwt. blood and bone, 1 cwt. super, $\frac{1}{2}$ cwt. sulph. potash, and $\frac{1}{2}$ cwt. sulph. ammonia. The land is very free from weeds, as all the crops were kept clean. How would you advise me to proceed on lifting the mangels? What is the best form in which to apply the lime? Can I obtain lime, inoculated soil, and seed from the Department? If not all of them, can I obtain either? I may mention that the land is held on renewable lease under the Land for Settlements Act.

The Fields and Experimental Farms Division replies,—

The general treatment of land for lucerne-growing has been set out in the August (1911) and May, July, September, and October (1912) issues of the *Journal*. It would occupy far too much space to set it out again in detail. The land should be ploughed so soon as the mangels are removed. Lime is best applied burnt and ground. Owing to the large number of applications, the Department's offer of lime, seed, and inoculated soil has been withdrawn. It is expected that the offer will be renewed in the coming autumn.

SPRING FEED.—LUCERNE.

MR. C. A. BLOOMFIELD, Mabel, Southland, writes,—

I have an area of land stumped last winter on which I intended this month to sow turnip, but have been unable to get ready in time, and the land is not yet broken up, but will be so by beginning of January, and I shall be glad if you will advise as to what it would be best to sow in order to get the maximum amount of good feed for cattle during next spring and summer. The land is of fair quality, on clay and gravel. Would a mixture of Italian rye, rape, and clover sown in autumn be suitable, and, if so, what seeding and manure per acre should be given?

I have a small plot on which I sowed lucerne in the second week in October, and the plants vary from 2 in. to 7 in. in height. The plot received a light application of caustic lime only. Would the lucerne benefit by being cut back and by top-dressing with liquid manure from fowl-droppings mixed with lime?

The Fields and Experimental Farms Division replies,—

The proposed mixture of grasses would appear to be suitable. Without a knowledge of that particular part of Southland it might be misleading to state the quantities of grasses that should be sown. On such land over a greater part of New Zealand basic slag is considered a satisfactory manure. It is applied in quantities varying from 3 cwt. to 5 cwt. per acre.

Spring-sown lucerne should be cut back before the end of the year. The liquid-manure top-dressing you suggest would be of assured benefit.

FERTILIZER.

MR. H. W. PARSONS, Onewhero, writes,—

Will you kindly inform me through the correspondence columns of your *Journal* if it is advisable to mix nightsoil with wood-ashes.

The Agricultural Chemist replies,—

These fertilizers should not be mixed.

“GASSY” MILK.

MR. A. W. HALL, Waimamaku, Hokianga, writes,—

Can you tell me whether land that has been heavily manured in the autumn with basic slag, and sown down with Italian rye and cow grass, and allowed to grow very rank, would affect the milk of cows grazing on it? I may say the rye has run to seed. My reason for asking is that the manager of our cheese-factory at Waimamaku complains of my milk being “gassy.” I might state that others having rank feed have had the same trouble, but not on manured land.

The Dairy-produce Division replies,—

It is not considered that the use of basic slag for top-dressing pastures is in any way detrimental to the quality of the milk produced. At the same time, when rye and clovers have a very rank growth the milk sometimes possesses an objectionable flavour, but the same would apply to any rank feed of which the cows are allowed to obtain a constant supply. The cause of “gassy” milk is due to the action of bacteria, and can be avoided by a thorough cleansing of all the utensils with which the milk may come in contact, and the proper cooling of the night's milk and keeping it in a position where the surrounding atmosphere is pure.

ENSILAGE-PIT.

MR. A. S. H. KENDRICK, Tariki, writes,—

I would like you to tell me which would be the best place to make an ensilage-pit, on the level ground and of concrete, or to dig out a pit on the side of a gully, the top to be level with the ground? What would be the best size to feed about eighty cows?

Mr. W. Dibble, the Department's exponent in the making of ensilage, supplies the following information:—

The gully would be the more economical, providing it is fairly dry and that drainage is provided for. In excavating the pit in the gully, if taken out the size required, a considerable amount of money could be saved in the concreting work alone, as the main portion would only need to be filled in at the back with concrete, and the inside faced up. Wires should be laid through the concrete on the ferro principle to hold the front portion that is not so protected. It must be remembered to have the inside of the silo a perfectly smooth surface. It should be made round for preference. In selecting the site see that it can be made convenient for loading, unloading, and weighting, also for carting to stock. It is preferable to feed in the open paddock, owing to the strong aroma of the silage. If it is decided not to concrete the pit in the gully, make a point of keeping the sides of the material 18 in. clear of the banks. This will enable the material to settle down evenly. Unless

this is done it will hitch or hang on the rough surface at the sides of the bank in spite of weighting, and will let the air in, thus causing unnecessary waste. For a silo to feed from eighty to ninety cows I would suggest that two silos be made of the following dimensions: Circumference, 46½ ft.; height, 25 ft.; estimated weight of silage at 56 lb. per cubic foot, 106.34 tons. In carrying out the work in this way one silo should be ready to take advantage of crops almost at any season of the year, and there would also be a liberal quantity of silage on hand to keep up the milk-supply at all times.

PRESERVING PEAS AND TOMATOES.

MR. JAMES T. MCHARG, Woolston, Canterbury, writes,—

Would you kindly let me have a reliable recipe for preserving green peas, also for tomatoes. I have a fairly large garden of fruit-trees and vegetables. We can manage the fruit in syrup, but this season want to try green peas and tomatoes.

The Orchards, Gardens, and Apiaries Division replies,—

The following are reliable methods for preserving green peas and tomatoes:—

Green peas: (1.) The peas must be young—*i.e.*, not starting to make growth. (2.) Scald and partly cook the peas in a sieve, wire basket, or colander. (3.) Wash thoroughly in cold water, two or three changes. (4.) Fill the bottles and complete the filling with very light brine (just to taste the salt only). (5.) Preserve as fruit, but count the time from when the water reaches 180° Fahr.; bring up to 200° to 205° Fahr. and preserve for fifteen minutes or longer if the peas will stand the process, which they should do if correct in variety and condition: twenty-five minutes and upwards is preferable. (6.) Screw down and allow to cool as usual.

Tomatoes: (1.) The liquor should be a very light brine—say, 4 oz. to 6 oz. of salt to a gallon of water, prepared as recommended for syrup. (2.) The temperature should be 200° to 205° Fahr., and the time for preserving fifteen to twenty minutes according to the size of the tomatoes, counting the time from 180° Fahr. Grade the fruit for size, and do not cut them. With the exception of these and a few minor details the process is the same as for fruit.

SILVER-BLIGHT.—GRAPE-VINE.

MR. J. R. MCGREGOR, Waikohu, Gisborne, writes,—

Would you please be kind enough to let me know some good spray for silver-blight, which is making its appearance on some of the fruit-trees. I have been spraying with the Bordeaux and kerosene emulsion sprays in rotation, but they do not seem to affect this blight. I have also been using arsenate of lead—1½ lb. to 50 gallons of spray.

The Orchards, Gardens, and Apiaries Division replies,—

In some instances spraying with a thick limewash has proved effective in controlling silver-blight, in others the application in early spring as a soil-dressing of 4 lb. to 6 lb. of sulphate of ammonia or sulphate of iron has proved satisfactory.

VIOLETS.

MR. J. H. FARQUHAR, Seatoun, Wellington, writes,—

I have a bed of violets, and, like the famous fig-tree of the Bible, can get nothing but leaves, and them in abundance. One expert gardener tells me to grow them more in the shade; another, that they want more sun; another, that the ground is too rich; and yet another says the ground is too poor. Could you tell me what to do to get them to bloom? They are healthy and strong, but always go to leaf—just a flower here and there.

The Orchards, Gardens, and Apiaries Division replies,—

In order to secure more abundant flowering of your violets I should advise you to transplant them in the autumn or early spring into soil that is not too rich.

COMMERCIAL REPORTS.

BRITISH DAIRY-PRODUCE MARKETS.

The High Commissioner for New Zealand in London reports as follows, under date of London, 1st November :—

For some time past the markets for both butter and cheese have been somewhat unsatisfactory.

In the butter-market an outstanding feature has been the restricted supply of finest quality and the heavy offering of secondary grades. It is known that this year, in contradistinction to last, when nothing was available for the purpose, very large supplies of butter have been held in cold-store. These for weeks past have been steadily drawn upon, and considerable quantities have been offered for sale. The stored butters, naturally, have opened out in but secondary condition, and have been purchased at prices much below those realized for sound "best quality" shipments that have been coming to hand. Unfortunately, there is still a considerable quantity of stored butter to be cleared. For really "finest" butters, however, there has been a steady demand at good prices, scarcity having helped to maintain values.

Another feature is that, whereas last year the Continent was, owing to the drought, a large buyer of butter on the London market, this year there is not this demand. On the contrary, shipments are being made from the Continent to this country. From France alone, from the beginning of August up to the present time, supplies have been nearly three times as great as last year. Considerable shipments are even now coming forward, and, judging from the prevailing climatic conditions on the Continent, these are likely to be continued for some time.

Argentine supplies are expected to show a great increase this season over former years. The quality of Argentine butter is recognized on the London market as being excellent, and what already has come to hand has given satisfaction, the price so far realized for it being 118s. per cwt. for salted and 120s. per cwt. for unsalted. These prices are the same as realized for Australian new season's butter.

The outlook for New Zealand butter for the coming season, which may be said to open with the arrival of the s.s. "Turakina" on 7th November with 8,350 boxes, is difficult to determine. It may be described as doubtful and speculative, and is not altogether too encouraging. It is understood here that little, if any, butter has been sold forward in the Dominion, and that nearly the whole season's output will come forward on consignment. If this is so, it is natural to conclude that an effort will be made to "bear" the market and to depress prices. Buyers who in former years made extensive purchases in the Dominion of factory outputs may be expected to resent the rejection of the high offers they have this season been making for outputs. Being compelled to buy for their trade requirements, it may be anticipated they will attempt, if possible, by keeping off the market and by buying only from hand to mouth in small quantities, to effect their purchases at as low a figure as they can. Naturally, they will not assist in the encouragement of independent consignment. I am inclined to think that shippers' representatives to whom consignments are made in this country will have to be firm and fight strongly in their clients' interests to realize satisfactory prices.

The strength of the position in the New Zealand consignor's interest lies in the fact that choicest butter is in comparatively small supply, and that the demand for such quality is good; that the bulk of New Zealand butter on the market here is recognized as coming up to that standard; that New Zealand supplies are expected to be less than last year, on account of the transference of a considerable portion of the make in the Dominion to Canada, and the change by some factories from buttermaking to cheesemaking this year; and that the general desire of the better-class retailers who formerly have handled New Zealand butter will be to again place it before their customers.

The market for New Zealand cheese, unfortunately, has recently been showing signs of weakness, and the outlook for the coming season's sale for shipments from the Dominion is not so hopeful as could be desired. The make throughout England this year has been large, owing to the wet season giving heavy grass crops. Stocks have been held back from sale to a considerable extent all over the country, and the total available supply of English cheese is larger than usual. Canadian supplies are also considerable, and although it has been reported that the local consumption in that country has been increasing, I am informed that the stocks available for shipment to this country are heavier than they were last year. Values of Canadian cheese have for some weeks been quietly but steadily declining, and have fallen from 66s. to 61s. per cwt. c.i.f. during the past six weeks.

In my opinion, the markets for both butter and cheese are more likely to become less active than to advance, and net returns realized by shippers are likely to prove disappointing to those who declined offers for their outputs at the beginning of the season.

Reporting at a later date, 22nd November, the High Commissioner says,—

Since making my last report to you concerning the markets in this country for dairy-produce the New Zealand season has commenced. The arrival of the s.s. "Turakina" with 8,350 boxes of butter and 1,200 crates of cheese, followed by the s.s. "Corinthic" with 22,000 boxes of butter and 7,150 crates of cheese, has thoroughly tested the market.

In my last report I stated that the markets for both butter and cheese were more likely to become less active than to advance. Unfortunately, my opinion has been more than justified, for the markets for both have become even more depressed than anticipated, and trade has grown duller each day, until now there is a feeling of doubt and pessimism that makes business almost impossible.

The large multiple-shop companies—such as the Home and Colonial, Lipton's, the International Stores, &c.—are drawing on their accumulations of cold-stored butters and on their supplies of cheese. The result has been that prices have been steadily declining.

The shipments by both steamers arrived in good order and condition. The quality of both butter and cheese has given satisfaction to buyers. The butter ex s.s. "Turakina" realized from 120s. down to 116s., and the cheese from 63s. to 61s. per cwt. The s.s. "Corinthic" shipments, however, have not met a ready sale, and to effect clearances from 116s. down to 113s. have had to be taken for butter and from 61s. to 59s. per cwt. for cheese. Even at these quotations the whole of the consignments have not been cleared.

The weather has recently been most unfavourable for the sale of dairy-produce. It is unusually mild, grass is plentiful, and butter continues to arrive in large quantity from the Continent, and especially from Ireland. English cheese, as I have previously informed you, is plentiful and is falling in price.

One very peculiar feature of the butter-market, however, is that, whereas all classes of imported frozen butter—New Zealand, Australian, Argentine, and Siberian—have been falling in price, the market for Danish has been firm, and that butter has fully maintained its value.

NEW ZEALAND EGGS IN LONDON.

Under date of London, 16th November, the High Commissioner reports,—

By the s.s. "Turakina," which docked at the beginning of this week, there arrived a small shipment of New Zealand eggs, and, knowing the interest taken in the growth of the poultry industry of the Dominion, I have obtained a few particulars of the consignment from Messrs. H. A. Lane and Co., the Tooley Street house which has undertaken the disposal of consignment.

The parcel consisted of five quarter-cases, each containing three long-hundreds, the shippers being Messrs. Reilly, Scott, and Gill, of Dunedin. The wood of the cases is

still thought to be rather thick, but on the whole the present shipment is a great improvement on the last. The packing, also, is better, although there is yet some improvement to be made. Cardboard fillers have been used on this occasion, and these have enabled the eggs to arrive in a much better condition than did last year's parcel. Out of a total of 1,800 eggs, only 180 were broken, but the broken ones were the cause of another 209 bad eggs. Owing to the long time taken on the voyage, the moisture which is sucked up by the cardboard through the damaged package affects the surrounding eggs. No preparation whatever had been used on the shells, and, taking all things into consideration, Messrs. Lane consider it is a great success to be able to land New Zealand eggs in London in the sound condition in which the shipment came to hand.

As regards quality, the eggs are very rich, well selected, and of good size and colour, and all these points are taken careful note of by London buyers. The agents boiled some, and state that they cooked splendidly—nearly as well as English new-laid. The milky white of the latter was present in the New Zealand eggs, and the importers consider that if the right package can be found which will enable them to arrive in London in a sound condition there is a big future for the egg trade of the Dominion. On the voyage Home, by the way, they were carried in cool-chamber, at a temperature of 45°.

At the time of my inquiries Messrs. Lane were holding out for a price, and I am now advised that they obtained it, the satisfactory figure of 13s. per 120, net London, being realized. They tell me that the eggs are going up to the West End, but whether or not they will be sold as "New Zealand" cannot be ascertained.

For your information I enclose herewith copy of a report on the shipment which the agents are sending to the New Zealand Press representatives in London, and which will doubtless appear in due course in various newspapers in the Dominion.

An important point in regard to the shipment is that on the present occasion no preservative of any kind was used, thus demonstrating the correctness of Messrs. Lanes' contention.

NEW ZEALAND HOPS IN LONDON.

The High Commissioner for New Zealand in Britain reports as follows, under date of London, 28th October :—

The exhibits of hops received from the Dominion were duly displayed at the Brewers' Exhibition, and were awarded the first prizes in the classes both for "Hops suitable for Fine Ales" and for "Hops suitable for Ordinary Beers."

The hops were well displayed, and attracted a considerable amount of attention. Several inquiries have been received from hop-merchants concerning the output of the Dominion. Information has been supplied to them, and the names of hop-growers in New Zealand have been furnished, so that probably buyers here will open up communication with them in regard to the crop for the coming season.

Although no other entry of colonial hops was made, and consequently our samples met with no competition, I think they rather gained by being in a class by themselves, and secured a good advertisement for the Dominion. The effect on the New Zealand hop trade at present may be small, but many persons who previously knew nothing of the product have certainly been interested therein, and further inquiries on the subject may be expected.

VANCOUVER MARKET.

THE New Zealand Government Agent at Vancouver, under date of 26th November, reports,—

Butter.—Early shipments of New Zealand creamery from direct steamer "Makura" and via San Francisco have arrived, quality being very good on the average, although wholesalers report that a few brands are not quite up to the usual standard of New Zealand creamery. Australian shippers have been quoting butter at a price, duty paid, slightly lower than first-grade New Zealand, but buyers are content to pay the difference for the New Zealand article.

Cheese.—Several cars of Ontario cheese have arrived in Vancouver. The quality is up to usual standard. Eastern farmers consider that there is more money in sending their milk to the cheese-factories than in supplying the creameries for butter. A very high production of cheese is expected.

Eggs.—Owing to the very mild weather for this time of the year prices are not as high as they have been during the past two seasons. Heavy supplies have been received from Eastern Canada and from the American side, selling wholesale from 1s. 5d. to 1s. 10d. per dozen, according to size and quality.

Poultry.—Large importations are necessary to supply the special Christmas demand. Poultry comes to the coast from Ontario, Manitoba, and the central States of the United States. Prices rule as follows: Fresh frozen turkeys, 10 lb. to 15 lb., 1s. per lb.; geese, 9d. per lb.; chickens, 10d. per lb.; fowls, 9d. per lb.; ducks, 9d. per lb.

Beef and Mutton.—Beef prices rule as follows: Beef, 6½d. per lb.; mutton, 7½d. per lb.; Australian veal, 7d. per lb.; Australian mutton, 6½d. per lb.; local veal, 7d. to 8d. per lb.; pork, 7½d. per lb.

THE SEASON'S EXPORTS.

THE following comparative figures show the main agricultural exports of the Dominion to the United Kingdom for the months of October, November, and December in the past four seasons:—

			1909.	1910.	1911.	1912.
Mutton, carcasses	..	..	250,458	190,504	129,379	223,178
Lamb, carcasses	..	..	176,918	194,780	104,435	129,989
Beef, quarters	..	..	44,321	29,118	1,268	8,938
Butter, boxes	..	..	321,032	350,012	294,764	310,598
Cheese, crates	..	..	115,625	103,658	115,703	139,783

NOTE.—The first shipment of cheese in the present season was made during the last week in September. It consisted of 1,204 crates. As the first shipment in the previous season was made in October, the September shipment of this season should be added to the above total in order to furnish a fair comparison. Thus an increase for this season is shown of 25,284 crates.

The first shipments of butter in both seasons were made in September. In September, 1911, 6,404 boxes were shipped, and in September of this year 8,351. Thus the true increase of the amount of butter exported this season over that shipped in the corresponding period of last year is 17,781 boxes.

In 1880 the United States exported 80,000 dozen eggs: in 1911 it exported 13,250,000 dozen. The principal countries to which the eggs were exported were Cuba, Canada, Panama, and Mexico.

Cattle exported from Great Britain during the eight months ended 31st August numbered 1,763, as compared with 1,817 in 1911 and 2,562 in 1910. The value was £117,721, against £80,456 last year and £134,815 in 1910. *Sheep* exported numbered 1,103, against 2,375 last year, and 6,402 in 1910, the values being £11,306, £25,177, and £49,087 respectively. Of *pigs*, 438 were exported, against 394 last year and 462 in 1910, the values being £4,441, £4,927, and £5,382 respectively. *Horses* exported numbered 38,524, against 36,854 in 1911 and 33,460 in 1910. The values were £874,052, £848,498, and £733,081. Horses imported during the same period were 9,097, against 8,152 and 10,623. The value in 1912 was £283,327, £312,466 in 1911, and £372,127 in 1910.—*Live Stock Journal*.

SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

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THE JOURNAL OF AGRICULTURE.

[JAN. 15, 1913

Month.	Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri- gum, Cases.	Sundry.
January, 1912	237, 284	302, 399	12, 424	114, 512	64, 005	95, 994	..	.. 16	7, 295	6, 365	1, 942	3, 407	59 carcases pork.
1911	175, 337	287, 120	13, 568	90, 405	46, 375	127, 199	..	..	399	15, 234	3, 302	7, 094	590
February, 1912	208, 424	273, 246	13, 052	101, 544	62, 398	106, 074	607	..	..	6, 831	1, 615	1, 056	..
1911	242, 090	450, 406	24, 924	86, 368	46, 667	70, 030	23, 694	200	..	4, 428	1, 302	2, 113	1, 369 carcases pork.
March, 1912	324, 192	518, 402	20, 201	64, 925	49, 308	70, 022	..	4, 980	..	3, 832	1, 352	2, 644	16 carcases pork.
1911	264, 297	665, 822	26, 657	45, 912	40, 668	58, 362	40, 276	..	..	3, 650	1, 583	8, 982	2, 408
April, 1912	213, 178	355, 899	7, 046	38, 986	38, 137	31, 615	4, 905	2, 180	..	5, 134	1, 958	4, 458	..
1911	172, 563	491, 413	19, 106	14, 823	33, 411	42, 917	38, 456	6	..	9, 233	1, 827	2, 577	2, 431 carcases pork.
May, 1912	454, 506	744, 287	32, 691	1, 441	40, 535	51, 833	11, 157	26, 569	1, 500	11, 963	2, 826	6, 287	..
1911	304, 390	377, 105	20, 173	995	20, 732	33, 033	93, 854	..	..	7, 443	1, 210	7, 720	1, 087 carcases pork.
June, 1912	170, 738	287, 697	24, 605	558	7, 712	18, 138	9, 160	7, 622	2, 039	5, 646	1, 168	1, 213	221 carcases pork.
1911	214, 079	448, 432	15, 789	..	6, 323	19, 568	39, 422	..	14, 128	4, 763	525	5, 528	2, 434
July, 1912	291, 097	371, 474	29, 457	684	1, 255	16, 567	44, 324	23, 215	20, 573	7, 463	1, 856	5, 892	210 carcases pork.
1911	206, 869	260, 761	14, 296	..	276	14, 100	29, 452	..	10, 334	6, 022	1, 073	2, 786	175
August, 1912	207, 239	157, 589	10, 478	559	..	10, 409	42, 580	38, 802	19, 562	3, 758	523	4, 219	..
1911	66, 608	110, 054	3, 653	..	..	5, 260	31, 976	..	18, 231	3, 443	303	3, 475	203 carcases pork.
September, 1912	44, 657	40, 759	1, 174	8, 723	1, 204	6, 671	15, 742	17, 363	19, 983	2, 957	501	3, 671	..
1911	102, 081	40, 057	6, 059	6, 404	..	7, 390	38, 151	..	33, 059	5, 604	393	7, 672	220 carcases pork.
October, 1912	51, 263	15, 393	3, 882	49, 962	16, 389	4, 647	7, 952	64, 480	5, 396	4, 193	401	9, 075	..
1911	9, 417	2, 043	100	49, 636	11, 501	2, 152	..	..	32, 094	4, 514	754	2, 982	..
November, 1912	54, 175	8, 286	282	140, 751	57, 181	33, 305	3, 680	40, 896	13, 892	9, 866	1, 911	5, 466	..
1911	47, 770	10, 427	403	135, 741	57, 319	44, 954	15, 833	..	16, 606	7, 844	2, 183	3, 085	..
December, 1912	117, 740	106, 310	4, 774	119, 885	66, 213	44, 789	5, 868	30, 490	10, 070	3, 816	2, 613	3, 686	..
1911	72, 192	91, 965	765	109, 397	46, 883	54, 297	..	..	4, 366	5, 719	1, 364	2, 708	..

HEMP AND TOW GRADING RETURNS.

DECEMBER, 1912.

Hemp.—The total number of bales graded was 13,541, as compared with 8,120 for the corresponding month of last year, an increase of 5,421 bales. For the twelve months ending 31st December, 1912, the number of bales graded was 100,468, as compared with 87,473 for the previous twelve months, the increase being 12,995 bales.

Tow.—During the month 5,331 bales were dealt with, as compared with 2,306 for the corresponding month of last year, an increase of 3,025 bales. For the twelve months ending 31st December, 1912, the number of bales graded was 31,690, as compared with 24,895 for the previous twelve months, the increase being 6,795 bales.

HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF DECEMBER, 1912.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	680	1,674	508	11	38	2,911
Napier ..	..	..	140	2	..	..	..	142
Foxton ..	..	..	720	3,261	79	10	..	4,070
Wellington ..	..	18	1,334	2,694	375	27	..	4,448
Blenheim ..	..	26	189	..	..	..	..	215
Picton ..	..	63	108	71	81	..	..	323
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	20	96	248	5	..	..	369
Bluff ..	..	..	149	913	1	..	..	1,063
Totals ..	..	127	3,416	8,863	1,049	48	38	13,541
Percentages of totals	..	0.94	25.22	65.45	7.76	0.35	0.28	..

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	514	859	105	1,478
Napier ..	..	16	41	..	57
Foxton ..	124	570	202	..	896
Wellington ..	222	1,331	338	28	1,919
Blenheim ..	..	59	9	..	68
Picton ..	64	10	52	..	126
Lyttelton ..	..	90	35	..	125
Dunedin ..	..	95	116	..	211
Bluff ..	..	275	160	16	451
Totals ..	410	2,960	1,812	149	5,331

Stripper-slips.—Passed for shipment: Auckland, 71; Napier, 11; Foxton, 311; Wellington, 371; Picton, 43; Dunedin, 21; Bluff, 74: total, 902. Condemned: Foxton, 45; Wellington, 13; Bluff, 36: total, 94

NEW ZEALAND - VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since August last:—

	"Makura," 2nd Aug.	"Zealandia," 30th Aug.	"Marama," 27th Sept.	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.
Butter, boxes ..	3,987	2,717	4,428	9,777	5,945	11,377
Eggs, " ..	..	..	8	226	..	..
Beef, quarters ..	..	..	..	..	..	580
Veal, carcasses ..	..	..	..	..	..	393
Frozen sundries, packages ..	6	8	..	12	5	12
Wool, bales ..	21	..	..	..	6	20
Grass-seeds, beans, &c., sacks ..	480	..	..	50	177	..
Hides and skins, sacks, &c. ..	425	454	657	721	559	5
Onions, cases ..	..	3	..	..	..	..
Sheep-skins, bales	20	..	..	138	..	..
Jam, cases ..	..	50	..	125	100	50
Sundries, packages	144	90	5	21	329	92
Potatoes, crates ..	..	21	..	23	..	165
Kauri-gum, packages ..	..	72	69	46	53	21

NEW ZEALAND - SAN FRANCISCO SUB- SIDIZED STEAM SERVICES.

THE following are the shipments of produce for San Francisco, Rarotonga, Tahiti, and transshipments for Vancouver from New Zealand since September last:—

	"Moana," 12th Sept.	"Aorangi," 11th Oct.	"Tahiti," 8th Nov.	"Moana," 6th Dec.	"Aorangi," 3rd Jan.
Gum, packages ..	..	14	35	13	..
Seeds, sacks ..	..	..	80	10	..
Grain, &c. ..	..	123	194	61	343
Meats, cases ..	..	326	2	475	523
Onions, cases and sacks ..	..	3	3	2	3
Potatoes, " ..	..	3	..	20	26
Sundries, packages ..	..	263	189	240	562
Butter, boxes ..	..	1,147	3,725	8,413	7,410
Apples, cases ..	..	..	..	..	..
Hemp, bales ..	..	386	512	393	281

STOCK EXPORTED.

DECEMBER, 1912.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Donkeys.		Sheep.			Swine.	
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To Australia.	To Pacific Islands.	To South America.	To Argentina.	To Pacific Islands.
Auckland	..	41	..	..	..	..	358	75	..	92
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	..	..	..	..	..
Wellington	..	..	..	..	..	..	..	134	..	..
Lyttelton	..	..	..	..	..	7	..	41	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	1	..	..	3	..	..	..	..	..	..
Bluff	1	..	..	..	..	4	..	..	..	..
Totals	2	41	..	3	..	11	358	250	..	92

The following are the particulars of the horses shipped : 35 light mares, 3 pony mares, and 5 light geldings.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of December, 1912, of agricultural and farm products :—

Item.	Quantity.	Value.
Bran	Nil.	£ ..
Butter	Nil.	.. 1
Cheese	13 cwt.	116
Chaff	Nil.	..
Fruits, fresh, all kinds	3,261,054 lb.	35,508
Barley	Nil.	..
Oats	9 centals	12
Wheat	Nil.	..
Onions	11,204 cwt.	4,410
Pollard and sharps	Nil.	..
Potatoes	19 tons	145
Seeds, grass and clover	5,765 cwt.	21,050
Total values imported	..	£61,242

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of December :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
1	Whippet dog	Male	Sydney	Mrs. Emma Brooks	New Plymouth.
1	Collie	"	Liverpool	W. V. Timewell	Auckland.
1	Clydesdale	Stallion	"	W. P. Holmes	Okoroire.
2	Hack	Mares	Suva	H. F. Blagrove	Auckland.
SOMES ISLAND (WELLINGTON).					
4	Holstein	Heifers	San Francisco	Department of Agriculture	Wellington.
1	Holstein calf	Female	Ditto		
1	Holstein	Bull	"	C. W. Moore	"
4	"	Heifers	"		
1	"	Bull	"	A. E. Kernot	"
1	Pekingese terrier	Male	London		
1	Yorkshire terrier	"	"	His Excellency Lord Liverpool	"
QUAIL ISLAND (LYTTELTON).					
1	West Highland terrier	Male	London	V. Le Cren	Fairlie.
1	Pomeranian terrier	"	Liverpool	Mrs. O'Brien	Christchurch.
1	Ditto	Female	"	H. F. Nicoll	Ashburton.
1	Airedale terrier	Male	London		
1	Ditto	"	"	Mr. Knowles	Lyttelton.
1	Cocker spaniel	Female	"	J. H. Pugh	Christchurch.
1	West Highland terrier	Male	"	Fletcher, Humphries, and Co.	"

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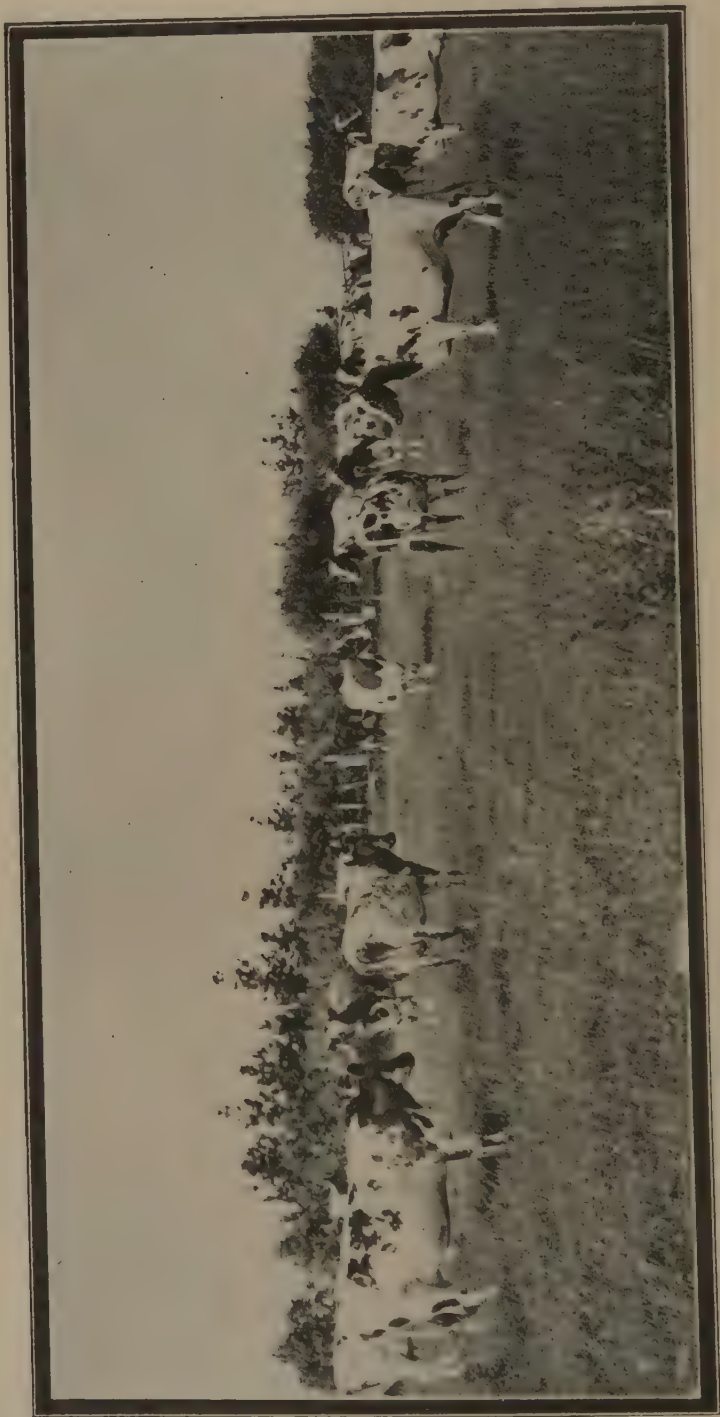
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Ayrshire Cattle at Mounahaki Experimental Farm.]



The
Journal of Agriculture.

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WELLINGTON, N.Z.,
15TH FEB., 1913.

PRICE,
SIXPENCE.

PLANT SELECTION AND BREEDING.

THE RUAKURA OAT.

PRIMROSE McCONNELL.

THE Ruakura oat—the rust-resistant variety bred from a selected head of the Argentina oat in the year 1908 by the Horticulturist of the Farm, Mr. A. W. Green—is now being produced on a scale sufficiently large to enable it to be tested for disease-resistance on a practical scale under varying soil and climatic conditions throughout the Dominion. Five acres have been cropped this season, which have given a return of 90 bushels of first-grade seed and 9 bushels of second-grade to the acre, the progeny in four years of half the result of a single head selected from the growing crop of Argentina oats for its disease-resistant power. Besseler's Prolific oat (note the name), growing under similar conditions to the New Zealand resistant oat, has only yielded 25 bushels per acre.

That the Ruakura oat is rust-resistant, as far as Ruakura experience of it has gone, is undoubted. More than this, during the four years of its existence no sign of smut or root-fungus has made its appear-



THE RUAKURA OAT, AND ITS ORIGINATOR.

ance on it, this while two other varieties growing in the same field and alongside it were affected with rust, smut, and root - fungus, the last-named disease being particularly bad. It stood the test of six days of exceptionally wet, muggy weather without any perceptible change in the bright colour of the straw and seed-head, while the other varieties in the paddock were turned almost black. The test was an undoubtedly severe one, and speaks volumes for the constitutional power of the new oat. It is particularly gratifying that this farm has produced a definite rust-resistant oat, as the several oats from abroad claiming to be resistant proved under test at Ruakura to have here none of the resistance claimed for them.

Slightly grey in colour, the oat is thin-skinned and is of fine quality, the bushel weight—the true test of value—being 46 lb. The heavy-weighting oat has naturally a good kernel. Though the quality of the oat is satisfactory, it can be improved from this viewpoint; indeed, selection to this end is now claiming the attention of the originator, Mr. Green. The quality of this season's product exhibits a decided improvement on that of last season, by reason of only carefully selected grain being used for last year's seed.

The history of the Ruakura oat is best told by Mr. Green himself, as it is he alone who has been responsible for this important evidence of the value to the agricultural world of the work of the plant-breeder. Mr. Green reports,—

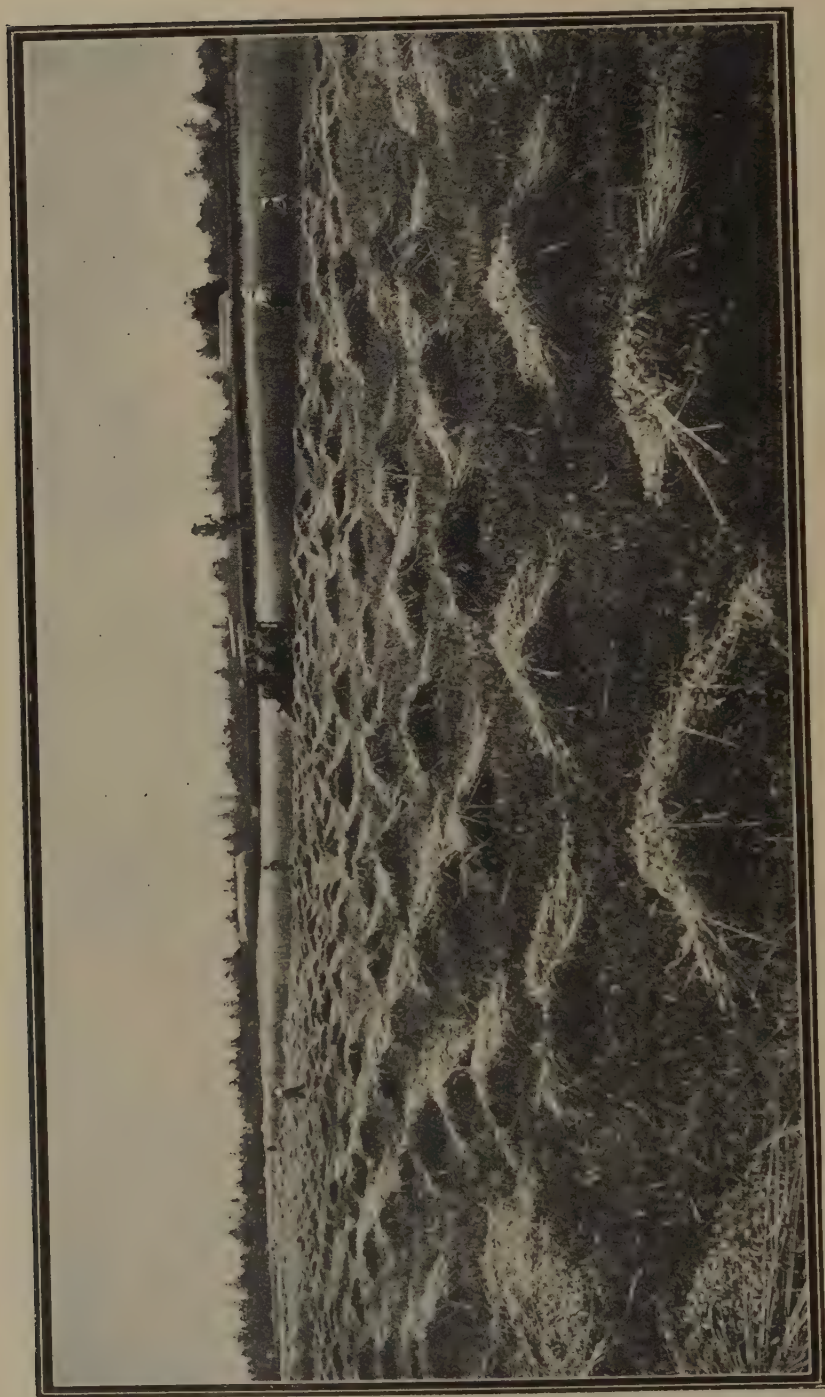
" Under instructions from the Director, Mr. E. Clifton, to make selections from Algerian, Argentina, and Red Rust-proof oats, in order to discover if a more highly rust-resistant oat could be obtained—these three varieties being less affected by rust than the remaining twenty-four varieties tested at Ruakura in the 1908 season—the work of selecting oats for rust-resistance was initiated. A previous attempt had been made to select for increased yield, but the result was nugatory, owing to all the varieties under test being rendered useless through rust. It was this experience that caused attention to be directed to selection for rust-resistance. In December, 1908, 1,050 single-head selections of the above three types were made, and were sown on the 15th September, 1909. Of these selections only seven were retained for continuance at the harvest on the 8th January, 1910. The seven selections were again sown separately, and out of these the foundation of the present strain, known as Ruakura Rust-resistant, was chosen. All along this one exhibited the strongest powers of rust-resistance.

" The crop from the single head reaped on the 2nd January, 1910, gave a yield of 376 heads, weighing, with 2 ft. of stem attached, 4 lb. 6 oz. The next year's test took the form of sowing half of this quantity and surrounding it with Tartar King oat, the most susceptible variety to rust at Ruakura. The remaining half of the 376 heads were reserved in case of a bad season destroying the selection sown. The sheaf of these heads is here illustrated. The following season seed-samples were distributed for testing in other districts, and the remainder of the seed, 12 lb., was sown on the 8th September, 1911, the resulting crop, harvested on the 23rd January, 1912, giving a yield of $16\frac{1}{2}$ bushels. This was sufficient to sow 5 acres this year, not counting the grain contained in eight sheaves reserved for shows and 4 bushels distributed to other experimental farms and the Fields Instructors. From the 5 acres 90 bushels of firsts and 9 bushels of seconds per acre have been obtained.

" It has never been claimed that the new oat is absolutely rust-proof. What can be claimed is that it is the most resistant to disease of all the varieties tested at Ruakura."



HALF OF THE ORIGINAL 376 HEADS



HARVESTING THIS SEASON'S CROP OF THE RUAKURA OAT.

A. W. Green, photo.]

FORAGE FOR DAIRY COWS.

T. W. LONSDALE.

A QUESTION which often proves perplexing to the dairy-farmer, and one which requires serious consideration, is how to provide a supply of early spring forage for in-calving cows. The subject is of vital importance, as each spring numbers of cows drop their calves before the ordinary pastures are producing more than sufficient to maintain life. At such times the value of artificial feeding is inestimable. Numerous crops are well adapted for supplying the dairyman's requirements, and the virtues of several have already been expounded by the writer.

A plant which has not received the attention it merits for this purpose is chou moellier, though it has formed the subject of numerous favourable reports. As forage for dairy cows it probably excels.

An important experiment in this connection has been conducted at the Moumahaki Experimental Farm, the primary object of which was to test the value of various forage crops for fattening lambs for the early market. On the 29th March, 1912, several acres were sown with rape, Buda kale, thousand-headed kale, silver-beet, and chou moellier. The seed was sown on ridges 26 in. apart, and the plants were afterwards singled to, roughly, about 15 in. apart. The crop was horse-hoed late in the autumn and during the early spring, but very little cultivation could be given owing to continuous rains. With the exception of silver-beet (which was sown at the rate of 6 lb. of seed per acre) the other varieties of forage received 3 lb. seed per acre. The manure, $3\frac{3}{4}$ cwt. per acre, was similar throughout, being basic superphosphate, $3\frac{1}{2}$ cwt.; sulphate of potash, $\frac{1}{2}$ cwt.; and nitrate of soda, $\frac{1}{4}$ cwt.

Chou moellier produced the heaviest crop, and on the 16th September, when stocking commenced, the approximate yield was 20 tons per acre. It was not so readily eaten as rape, though as cow-feed it certainly appeared pre-eminent.

Considering that chou moellier thrives during the winter, is easily cultivated, transplants readily, and gives a wealth of feed during the early spring, it will amply repay the farmer to give it a trial next autumn.

A SWEDE EXPERIMENT.

CO-OPERATIVE TEST AND CHEMICAL ANALYSES.

TWENTY-EIGHT varieties of swede turnips, grown under the co-operative experiment scheme, and superintended by Mr. A. Macpherson, officer in charge of co-operative field experiments in the South Island, were submitted for analysis to Mr. B. C. Aston, Chief Agricultural Chemist. These were grown on the farm of Mr. Joseph Smith, Stirling. All varieties were sown on the 2nd November, 1911, on soil uniform in character. They were treated alike as to cultivation and fertilizers applied, and were harvested on the 25th July, 1912.

Mr. Aston reports as follows: "Each individual root was analysed for percentage of dry matter. The roots were arranged in classes according to weight, the average percentage of dry matter in each class being given. The percentage of dry matter is considered to be a correct index of the feeding-value of the turnip."

In the report giving results of the analyses the Agricultural Chemist gives in each variety the average weight of roots, the number of roots, and the mean dry matter. For the purpose of reference, however, this has been extended by giving the average dry matter per cent. in each, and placing each variety in order according to that percentage. The yield of roots per acre is also given, with the total dry matter per acre in tons which such yields gave.

ANALYSES.

Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Sutton's Queen	6½	6	12.2	13.03	38.63	5.03
	5	14	13.1			
	4	9	13.3			
	3	4	13.5			
Montgomery's Skirvings, Purple-top	8	3	12.1	12.97	55.22	7.16
	7	3	12.1			
	6	5	12.5			
	5	7	13.1			
Nimmo and Blair's John Bull ..	4	21	13.3	12.77	43.53	5.56
	6	11	12.3			
	5	16	12.5			
	4	19	13.2			
	3	3	13.3			

Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Hurst and Son's Perfection ..	7	6	12.4	12.73	41.35	5.26
	6	6	12.4			
	5	13	13.0			
	4	9	12.8			
Hurst and Son's Kangaroo ..	8	3	12.0	12.73	38.63	4.91
	7	4	12.2			
	6	10	12.9			
	5	18	12.8			
Garton's Green Tankard ..	4	14	12.0	12.57	43.25	5.43
	8	3	12.0			
	7	3	12.5			
	6	12	12.3			
Garton's Pioneer ..	5	10	13.2	12.53	42.71	5.35
	4	17	12.8			
	3	5	11.6			
	8	3	12.0			
Webb and Son's Imperial ..	6 $\frac{1}{2}$	5	12.3	12.47	40.80	5.08
	5	15	12.6			
	4	15	12.6			
	3	9	12.6			
Hurst and Son's East Lothian..	7	8	12.4	12.36	38.90	4.84
	6	6	11.8			
	5	8	12.5			
	4	9	12.9			
Garton's Perfection ..	3	5	12.6	12.31	46.52	5.72
	8	4	11.7			
	7	4	12.1			
	6	4	12.0			
Garton's Victory ..	5	13	12.4	12.19	41.35	5.04
	4	9	12.4			
	3	10	12.6			
	8	3	12.3			
Garton's Model ..	7	3	12.0	12.14	39.99	4.85
	6	7	12.3			
	5	16	12.0			
	4	17	12.1			
Webb and Son's Giant King ..	3	4	13.2	12.11	44.07	5.33
	7 $\frac{1}{2}$	5	11.1			
	6	19	12.3			
	5	12	12.3			
Hurst and Son's Select Monarch	4	16	12.0	12.10	39.71	4.80
	3	8	12.5			
	7	7	11.8			
	6	8	12.1			
Hurst and Son's Best of All ..	5	6	12.3	12.08	46.79	5.65
	4	3	12.5			
	7	10	12.1			
	6	10	12.1			
Hurst and Son's Best of All ..	5	16	12.4	12.08	46.79	5.65
	4	6	12.3			
	6	6	11.3			
	5	16	12.4			
Hurst and Son's Best of All ..	4	9	12.0	12.08	46.79	5.65
	3	3	12.2			

Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Hurst and Son's XL All ..	8	4	12.2	12.02	44.88	5.39
	6	8	11.8			
	5	7	11.7			
	4	13	12.1			
Garton's Keepwell	3	5	12.5	12.01	43.25	5.19
	7	4	11.9			
	6	8	11.6			
	5	7	11.8			
Sutton's Champion	4	8	12.3	12.00	39.44	4.73
	3	6	12.5			
	6	7	11.6			
	5	19	11.8			
Garton's Cropwell	4	17	12.3	11.99	40.26	4.82
	3	4	12.4			
	7	3	12.2			
	6	10	11.6			
Sutton's Elephant	5	14	12.0	11.97	50.87	6.08
	4	16	12.2			
	3	5	12.0			
	7	5	11.4			
Sutton's Magnum Bonum ..	6	5	12.1	11.95	35.63	4.25
	5	19	12.0			
	4	9	12.1			
	3	5	12.1			
Webb and Son's New Empire ..	8	5	11.8	11.87	39.34	4.68
	6½	18	11.7			
	5	14	12.2			
	4	10	12.0			
Nimmo and Blair's Standard ..	3	9	12.1	11.80	41.35	4.87
	7	6	11.1			
	6	10	11.9			
	5	9	12.2			
Garton's Incomparable ..	4	10	12.0	11.78	52.23	6.15
	6	3	12.3			
	7	3	11.6			
	6	6	11.9			
Webb and Son's New Buffalo ..	5	5	11.4	11.72	42.16	4.94
	4	10	11.8			
	7	7	11.5			
	6	8	11.7			
Hurst and Son's Lord Derby ..	5	14	11.8	11.67	43.52	5.07
	4	10	11.9			
	3	8	11.6			
	8	3	10.2			
Sutton's Crimson King ..	7	7	12.0	11.66	43.80	5.10
	6	9	11.5			
	5	11	11.8			
	4	6	11.9			
Garton's Superlative ..	3	5	11.9	10.97	38.90	4.26
	8	5	11.3			
	7	11	11.5			
	6	5	11.5			
	5	12	11.8			
	4	8	11.6			
	3	7	12.1			
	6	4	10.5			
	5	15	10.8			
	4	13	11.3			

THE GREAT WHITE OR SWISS CHARD BEET.

PRIMROSE McCONNELL.

- THE specimen shown in the photograph is one of the white beets selected by Mr. Davies, Wellington, from the ordinary strain of silver-beet for its superior leafstalk, and was grown at Ruakura Farm of



Instruction. It is a biennial plant, differing from the red beet in having a smaller and much-branched root, instead of a large fusiform fleshy tap-root. It has larger leaves, with thick succulent leafstalks, having strong white ribs and veins. It is cultivated in gardens

entirely for the leaves, which are boiled as spinach, and for the leafstalk, which, when separated from the lamina of the leaf, is cooked and eaten as asparagus under the name of "chard."

It is not every one who cares for this vegetable, but some prefer it to cabbage; being more easily cultivated, it affords a winter supply of an excellent substitute for that vegetable. A sowing should be made annually, for, although the plant is biennial, it runs to seed during the second year, and leaves gathered from the shots or shoots are of poorer quality than the first radical leaves.

Experiments are at present being carried out at Ruakura to test its value as a stock-food, which, if successful, will bring it into general use on all sheep-stations on account of its being so easily grown.

It will adapt itself to various soils and climates, and will stand feeding off several times in a season.

POTATOES AT RUAKURA.

A. W. GREEN.

THIS season's potato crop at Ruakura Farm of Instruction is the most even and the healthiest crop yet grown. This success, I believe, is mainly due to selection of seed, while the better-constructed potato-shed, for storing tubers during winter, has no doubt assisted in improving the crop. With the object of securing the best seed for planting, the following methods were adopted for storing, sprouting, and selecting the tubers. The tubers were placed in shallow boxes, so that a current of air could pass between them, and all be exposed to light. The light had the effect of turning the tubers green, thereby keeping them firm, and preventing untimely sprouting. Finally, with good seed, it produced strong, sturdy sprouts. A good opportunity for selection was afforded when these sprouts were developing, for at this period weak sets can be detected by their weak eyes; and weak-eyed sets should never reach the potato-field. It is often due to these that a light crop is obtained, and the seed sample for next year is thereby ruined. A few of the varieties which are showing up above the average at Ruakura are Gamekeeper, Irish Queen, Commercial, Up-to-Date, Northern Star, Sutton's Bountiful, Conquest, Daniel's Sensation, and Gold Coin. The last-named variety was the first to come into flower, and, although it cannot be called a first early, it has the advantage of quickly maturing its crop. One spraying has been applied, and the crop is free from blight.

WESTERN WOLTHS GRASS.

AT Ruakura three acres were sown with the above grass on the 14th May, 1912, and, although the winter was wet and some of the land in question naturally so, the first crop averaged 15 tons per acre of green forage. The grass was fit for cutting on the 7th October. It was carted out to horses and cattle (including milk cows), and it was relished by all the stock. The milking-cows maintained their flow of milk well while being fed on it. The second crop was allowed to ripen for seed, and has been reaped with the binder. Had this been required for green forage, it was available for that purpose on the 1st December, with an average weight of 12 tons per acre. Provided the weather is reasonably moist, a good third crop of green fodder should be available in a few weeks' time. The great drawback to this grass is that it removes so much fertility from the soil, and under New Zealand conditions its cultivation should be confined to strong soils. It is an annual. If sown in May it undoubtedly comes in at a time when there is often a scarcity of feed; but a crop of, say, oats and tares, or, say, barley and tares, could be available at the same time and would be better fodder and much better for the soil. Possibly the best use to which this grass can be put is to feed it off in its young stage with lambs or sheep, netting the paddock off in plots so as to allow the fed-off plots time to recover. The western wolth's undoubtedly grows a much greater weight per acre than the ordinary Italian rye-grass.

LUCERNE.

SINCE cutting the plots on the 23rd October the rate of growth has been variable with the several varieties. Arabian and Peruvian outgrew all others during the first three weeks. Since then Hunter River and Colonial have gained on them, so that now Colonial is heaviest. American made greater growth during this month than in any previous month dating from sowing. Turkestan remains dwarf, resulting in the lightest crop. Plots testing what results can be obtained from single lucerne-plants have been laid off. In conjunction with these are tests to judge what benefits may be derived by using highly nitrogenous manures to lucerne and leguminous crops, also to compare soil-inoculation *versus* no inoculation *versus* stable manure. All the new strains of lucerne received were sown in these plots. Without exception the germination was over 90 per cent. Since appearing above ground the seedlings started away strongly, and a good stand of each new variety is assured.—A. W. Green, *Overseer of Orchards and Gardens, Ruakura Farm of Instruction.*

HOME SEPARATION.

CARE OF CREAM ON THE FARM.

G. M. VALENTINE.

It is a well-established fact that the quality of the manufactured article depends principally on the character of the raw product, and this applies with special force to cream separated on the farm and delivered to a distant manufacturing centre, often at infrequent intervals. Further, it has been conclusively proved that good butter can be made from gathered cream, if this has been carefully handled and delivered in a good condition to the factory. Given a daily delivery of well-cared-for cream, it is possible to make just as good butter under home separation as under the whole-milk principle; but as this is not always possible—in fact, the system is generally in operation where transit difficulties make a daily delivery impracticable—the necessity for care on the part of the farmer in the handling of the cream is seen to be a vital consideration in the success of the undertaking.

CLEANLINESS ESSENTIAL.

If there is one principle more than another which should be emphasized in the successful handling of cream it is that of cleanliness. With milk and all its products this is the great secret of success, and the farmer separating his own cream should paste this fact in his hat if he would succeed in producing the best article and thereby afford the factory-manager a chance to turn out a first-grade butter. Let it always be remembered that it is the first-grade article that brings the first-grade price, a fact particularly emphasized this season. Conditions on all oversea markets have enabled buyers to discriminate more strongly than in the past between first and second qualities. It therefore behoves the farmer who is unable to make a daily delivery of his cream to take such care of it that he will be able to land it at the factory in the best order possible under the circumstances.

The general principles laid down in regard to handling milk on the farm under the whole-milk system apply with equal force where home separation is in vogue. Having produced a clean milk, this should be at once removed to the separating-room, never under any circumstances being separated in the milking-shed. A special room should be provided for the separation, at least 30 yards from the milking-shed, and it should be located on the windward side of the shed. This should never be used for any other purpose. It should have a concrete floor, be

provided with good drainage-facilities, be well ventilated, and be furnished with a good supply of water both for cooling and washing purposes.

COOLING THE CREAM.

If possible, separating the cream should be carried on simultaneously with the milking process, as the cleanest skimming is obtained when the animal-heat is in the milk. An efficient cooler should be provided, in order to reduce the cream to the lowest possible temperature. As the amount of water required to cool the cream is comparatively small, this should present no serious difficulty. It is also advisable to provide a trough of cold water, preferably running, in which to stand the cream-cans, in order to maintain their contents at a reduced temperature. Should a satisfactory supply of water for a cooler not be available, the trough system will have to be depended on, and the cream frequently stirred to reduce the temperature. The stirring is necessary in any case to break up the froth which collects on the surface of the cream. For this purpose nothing is better than the perforated plunger generally used in factories. Being made of metal it is easily kept clean. It is not to be thought that, where cream is delivered daily to a factory, the cooling is unnecessary. I have sometimes seen cream delivered every day, but which had been carelessly handled, arriving at a factory in a worse condition than a two days' supply which had been handled with every care and had been effectively cooled.

Under no circumstances should cream from one skimming be mixed with that from another skimming, unless it has been previously well cooled, as this is one of the causes of that worst of all defects in home-separated cream known as the "fermented" flavour. The most unsatisfactory of all suppliers to the home-separation factory is he who places a can under the separator and does not touch it again till it has received the cream from several milkings, neither stirring nor cooling, the cream being thus held at the very best condition for the development of acidity and of undesirable flavours. While held on the farm the cream-can should be covered with a light cheese-cloth to keep out dust, and this cloth should be thoroughly washed and then dipped in boiling water each time it is used.

THE SEPARATOR.

On the care of the separator largely depends the success of home separation. Unless this is kept sweet and clean it is impossible to secure the cream in a sound state. Thorough cleaning after every time of use is imperative—not merely the running through the machine of some hot water, but the dismantling of the machine and the effective cleansing of all the parts. The idea that it is not necessary to wash the machine more than once a day is entirely wrong, and if practised will invariably cause rapid deterioration of the cream.

Having finished separating, first wash the various parts of the machine with warm (not hot) water to which has been added a little washing-soda or a reputable cleansing-powder. A brush should always be used in preference to a cloth, which rapidly becomes unsanitary. Thoroughly scald with boiling water, and place to air, preferably in the sun but in a sweet atmosphere, until again required. With this process no drying is necessary.

CREAM-CANS.

It is very necessary that the cream-cans should be thoroughly cleansed and scalded. Although in the majority of cases the cans are washed at the factory, it is most desirable that they should be cleansed again before being used, and the method advised for the separator applies also in this case.

CARRIAGE OF THE CREAM.

Having taken every care to produce a well-conditioned cream, it is necessary to see that it is handled in transit in such a manner that it will arrive at the factory in the same good order. If left on the roadside to be picked up, it must be protected from the sun by any simple means, provided it is effective. The farmer's interest in his cream should not end at this point. He should see to it that the same care he has taken with it on the farm will be exhibited by the men responsible for its conveyance to the factory. Bad flavours are frequently developed by reason of the sun striking on the unprotected can.

PAYMENT ACCORDING TO QUALITY.

The care of the cream throughout all stages of production and handling is a vital matter to the farmer. In the majority of home-separation factories in this country to-day the one price is paid for all grades of cream, a practice much on all-fours with the old unsatisfactory system of paying for milk by the gallon. But the day is near at hand when cream will be paid for according to the condition in which it reaches the factory as well as for its butter-fat content. The men who handle their cream properly should assuredly be recompensed in money value for their trouble, just as the men who fail to realize their duty in this connection and thereby reduce the market value of the factory's output should be penalized.

THE FIRST AND LAST WORD.

There is one word of advice on this subject which cannot be repeated too often; it is the first and the last word on the successful handling of dairy-products, and it is the secret of success at the present advanced stage of the industry just as it was when the dairy-farmer and butter-maker were working under the most crude conditions. This all-important word is **CLEANLINESS**.

BROOM OR CLOVER RAPE (OROBANCHE MINOR).

A. HUGHES.

THERE are several species of broom-rapes, but the only one naturalized in New Zealand is the lesser or clover broom-rape, *Orobanche minor*. As I have had several inquiries about it, and have seen it in paddocks of clover in the North Canterbury district, it may interest farmers to know something about it, or enough to identify it if found in their fields. This parasitic plant is destitute of green-colouring matter, and so, unlike green plants in general, is impotent to manufacture sugar and starch from carbon-dioxide and water to meet its food requirements. Broom-rape is wholly a parasite, and becomes a robber of other plant-life. The seed is sometimes sown accidentally with clover, and when it germinates becomes attached to the roots of the crop. To get command of the food in the plant to be robbed the parasite has a special tool called a sucker, which is inserted into the root of the host plant. Owing to this peculiar mode of attack it is commonly called a root parasite. Once the robber gets command of the food resources of a plant it immediately turns them to good account, for it transforms them into a corpulent underground body called the tuber, from which proceed the roots, or suckers, that attach themselves to the clover. The stem is erect and fleshy, bearing small colourless pointed scales instead of leaves. It is from 8 in. to 12 in. high, and is at first a yellowish-brown colour, turning darker in shade as it grows older. At the free end it bears flowers of a dirty-white colour. These produce oblong capsules full of numerous minute seeds of a dark colour. To prevent the attack of the broom-rape the seed of the red clover must be absolutely free from the seed of the parasite. If any spot in the clover-field shows signs of the parasite the plants there should at once be dug out and burnt, to prevent seeding. On no account should broom-rape plants be allowed to seed.

NOTE BY A. H. COCKAYNE.

The broom-rape (*Orobanche minor*) is, in Europe, looked upon as a very serious clover-parasite, and is said to cause wholesale destruction in fields that are devoted exclusively to clover-growing. It is especially detrimental in those clover crops that are grown for seed.

Where present it is said to seriously diminish the yield of seed and to lower its quality.

In New Zealand it has been naturalized for many years past, and in certain localities is excessively abundant. There are fields in the Auckland District where nearly every clover-plant appears to be affected, and the whole ground is thickly studded in the early summer with the thick erect brownish-red asparagus-like shoots of the parasite. After the broom-rape comes into flower the stems, which hitherto have been fleshy, dry up, and all the aerial portions die away, fresh shoots being again developed in the following year. It is very peculiar that no complaints have ever been received that the broom-rape injures the vitality of the clover-plants to any appreciable extent. I have specially studied this parasite in the Auckland District, where it appears to be spreading rapidly, and is now everywhere to be found, but have not noticed any appreciable difference in the vitality of affected and unaffected plants. When it is considered that the whole of the food-supply necessary to produce the broom-rape, which is quite a large plant compared with the size of the host, is derived from the plant on which it is parasitic, it would appear that the drain on the affected plants should result in a very serious diminution in their vitality. In general, however, affected clover-plants appear to be quite vigorous, and in no cases have plants been seen whose death could be attributed to this parasite. Nevertheless it seems incredible that clover-plants can be made to provide all the food necessary for the development of the broom-rape without considerably impairing their yield. Sweet-peas attacked by broom-rape have been frequently received, and in all these cases a serious diminution in growth had resulted from the attack. Again, last year in the Wairarapa a crop of affected parsnips came under my notice, and the development of the roots of all the affected plants was seriously interfered with, finally resulting in considerable distortion.

From the above it can be seen that the question of the seriousness of broom-rape in New Zealand is a debatable one, and the opinions of farmers who may have had experience of this parasite in their pastures would be especially valued. No attempt is made in New Zealand to prevent the seeding of this weed parasite—a matter of great importance if it is shown that it really causes any harm.

Distribution in New Zealand.

Broom-rape is exceedingly abundant throughout the whole of the Auckland Province. It is also common in Taranaki, but further south is comparatively rare. In Canterbury it has been naturalized for many years in odd localities, but does not appear to be spreading.

No specimens from Otago or Southland have as yet been received by me.

Host Plants in New Zealand.

Broom-rape has been recorded on the following plants in New Zealand: Red clover, alsyke, white clover, birdsfoot trefoil, trefoil, burr clover, sweet-peas, parsnips, hawkweed, dandelion, and cats-ear.

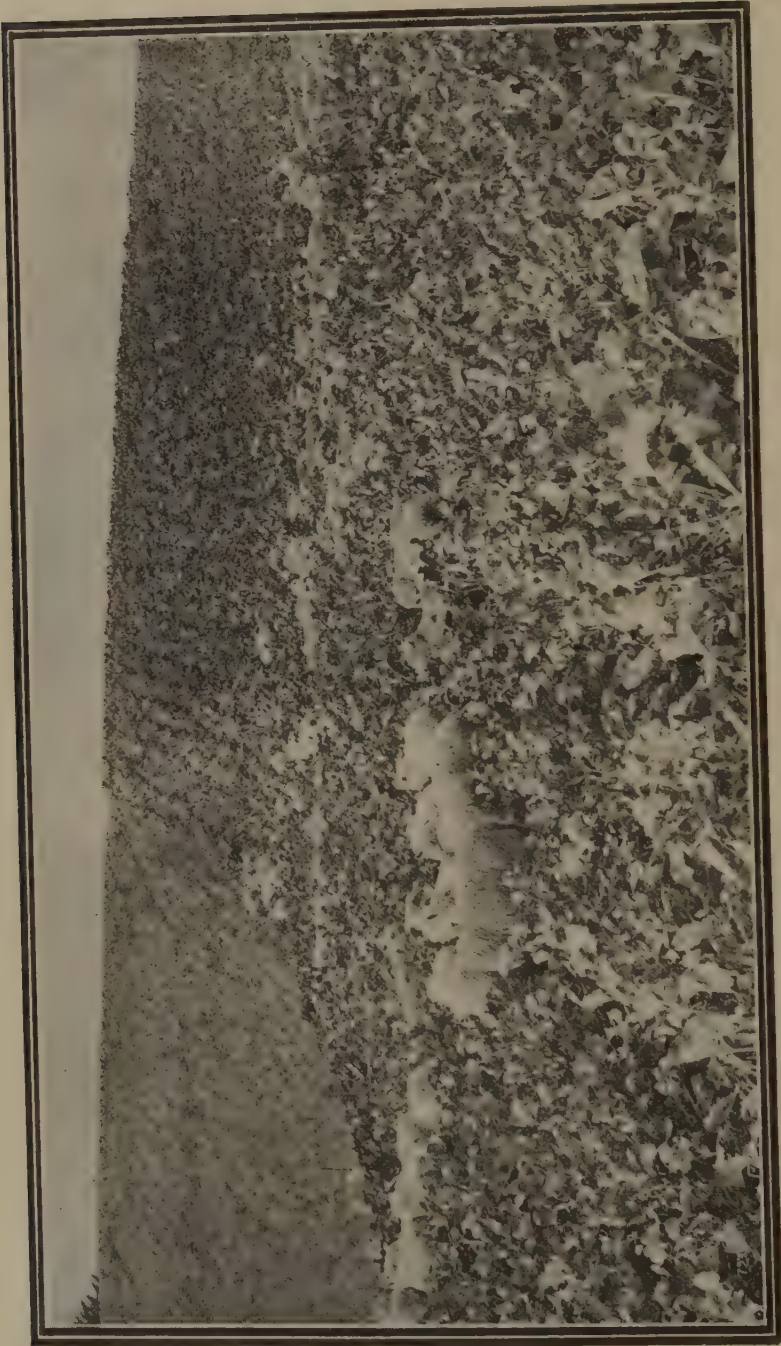
Seed-dispersal.

In many agricultural books it is suggested that broom-rape is regularly distributed in clover-seeds. This is very unlikely, as the seed is so small that it is almost impossible for any to remain in clover-seed even if this seed is very imperfectly dressed. Perceval records finding broom-rape in clover-seed, but the seed-station at Zurich during thirty years never noted it in any commercial samples. In our own seed-testing no broom-rape has ever been found in any samples that have been submitted for examination. The seed is exceedingly minute, being amongst the smallest of any seeds belonging to the flowering-plants. In consequence, it can be easily transported great distances by the wind. I hold that animals must play a very important part in the disposal of broom-rape, as the seeds can easily be carried about in the wool and hair of animals that graze on areas where this plant is at all abundant.

THE SOYA BEAN.

A MEDICAL point of view is given in the *Lancet* of the 21st January, 1911: "On account of the great nutritive value of the Soya bean it is well worth medical attention, more particularly for diabetic cases, because of its low proportion of starch. For making biscuits, soup-powder, infant and other foods, it will be widely used in future when its dietetic value becomes better known." In the United States it has been found that the yield of crops of all kinds is increased where they follow Soya beans, wheat in large fields showing an increase of 5 bushels per acre over that grown on land alongside that had not been under beans. Wheat generally follows a nitrogenous crop in the usual rotation schemes on the Continent. As a fodder crop, as a soil-renewer, and as a green manure, the Soya bean has been successfully grown in countries other than its native habitat, and under varying climatic conditions. There are over three hundred known varieties and hybrids of the Soya bean.—*Journal of Agriculture, Victoria.*

The successful farmer knows his soil, his seed, and his manure. He does nothing by guesswork.
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SHEEP ON THE RAPE CROP AT MOUMAHAKI EXPERIMENTAL FARM.

DAIRYING.

WINTER FEEDING AND, INCIDENTALLY, SOME REMARKS ON THE GENERAL TREATMENT OF THE DAIRY COW.

PRIMROSE MCCONNELL.

THE feeding of the dairy cow is of the greatest importance, and it is essential that every dairy-farmer give the matter careful study in order to determine the system which is most suitable for the locality in which he is farming—a system which should be designed not merely with the object of producing the highest results regardless of cost, but one which will produce the maximum of result at a minimum of cost.

Before touching on the food question I would just like to say a little on one or two other points which in my opinion are of the utmost importance in the successful management of the dairy herd. I consider the first question every dairy-farmer should ask himself is, "Do my cows pay for all the food they consume and yield a little profit as well, or are some of them merely 'boarders'?" When we take into consideration the fact that in New Zealand the average butter-fat yield per cow per annum is only about 160 lb., it is easy to realize that a very large number of cows are being kept at an absolutely dead loss to the farmer, and that in many instances the profit realized from cows of high milking-capacity is completely wiped out by the loss incurred through keeping "boarders." It is also important to grasp the fact that no amount or kind of extra feeding will make the "boarder" pay—in fact, the more she is fed the greater will be the loss; while, on the other hand, the cow of great milking-capacity will give a good return for liberal treatment in the matter of feeding. Now, the only way which will enable the farmer to determine between the profitable and the unprofitable cow is by the use of the scales and the Babcock or other tester; and, depend upon it, the use of these will afford many a surprise, as it will be found that the cow or cows which previous to testing were considered to be the best may prove to be second-rate only—indeed, much inferior to others which may have been set down as being the least profitable of the herd. Speaking from my own experience, I am also quite certain that as soon as testing is commenced the interest in the herd increases; and the same applies to employees, if they are worth their salt. The farmer will then find himself more

willing to carry out by every means within his power that which will tend to produce a good all-round result; in fact, it will make dairying a much greater pleasure to him than it previously has been. As soon as the "boarders" have been detected, cull without mercy. Perhaps the farmer may plead that he cannot buy other cows to fill their places; but is he not better off with twenty cows, all of which give a good profit, than with forty, twenty of which are kept at a loss? and, as I previously stated, the loss on the one half may completely wipe out the profit on the other half.

Many farmers do not know whether their cows are being worked profitably or not; many say that it is too much trouble to keep records, and that it does not pay for the time spent over it. On the other hand, every farmer who has tested his cows and culled the unprofitable ones knows that it does pay and that it is very little trouble. It is blind policy to simply total up the proceeds at the end of the season and divide the result by the number of cows; it gives no idea whatever of the possibilities of a herd.

Perhaps one of the most important questions a dairyman can ask himself is, "In the matter of breeding am I adopting the best means of building a high-class herd?" One thing is very certain—you cannot afford to buy scrub bulls at so-many shillings per leg. When you have made an independent fortune you can afford to indulge yourselves in that direction, but not before. Whether you have to beg, borrow, or steal him, procure a high-bred sire from a well-known milking strain, and you are on the direct road to success. I am not advocating any special breed—that is for the farmer to decide; but I do advise, once a breed has been chosen, to stick to it through thick and thin. No good permanent result has ever been obtained through crossing and recrossing—it is the direct road to the Bankruptcy Court; and in my opinion it is much easier to improve a breed than to manufacture one. We are in no need of new breeds; but we are in great need of more good individuals of the existing breeds. It may be better to have a good animal of unknown breeding than a common pedigree animal, but it is a fact that in order to produce the best animals we must stick to some one breed and use sires of the desired type of this particular breed continuously. When it has to be admitted that, even when exercising the greatest care in the choice of a sire, the results are sometimes disappointing, it can safely be concluded that to breed from an animal simply because it happens to be of the male sex, or to buy animals in the open market simply because they happen to be of the female sex, can only lead to disaster.

Proper feeding and care of the young bull as well as the cow must not be overlooked, as it is of the utmost importance, and if bred for

sale the half-starved animal will be only a scrub in the eyes of the public.

There is yet another important point which I must mention—namely, gentle treatment. The very best feeding, if accompanied by a kick and a growl, will not induce a cow to yield to her utmost capacity. As a matter of fact, a cow that is abused in any shape or form will yield milk of less quantity and poorer quality than if she were treated with gentleness, and exhaustive experiments recently carried out in America prove this up to the hilt. The man who kicks or otherwise ill-treats a cow should be flogged without mercy. A reasonable amount of shelter is also necessary, otherwise some of the nerve force which would be spent in the production of milk is spent in maintaining the heat of the body.

It will be generally agreed, I am convinced, that the above recommendations are inseparable from, and must, indeed, go hand-in-hand with, good feeding if the best results are to be obtained from dairy herds. It is now a well-known fact that milk and butter-fat yielding capacity of breeds of cows and of individuals is hereditary, and that this natural function can be artificially developed only to a limited extent. This, of course, applies more to the butter-fat than to the milk yield, for the quantity of the latter may undoubtedly be increased by certain systems of feeding; but no system of feeding will appreciably increase the percentage of butter-fat.

Liberal winter feeding of the dairy cow is undoubtedly of the utmost importance, and it is a deplorable fact that a number of cows in New Zealand die in winter through starvation. It is absolutely essential that the cow should reach her period of lactation in fit condition, and this cannot be accomplished on bare winter pasture alone. Having a large stomach-capacity, the cow requires a bulky feed. This should be of two classes, a succulent feed and a dry one. The combination may consist of roots and hay—mangels and lucerne for choice. The amount necessary for an in-calf cow will depend on the breed and size. The average cow will consume 10 lb. of hay and from 20 lb. to 30 lb. of mangels. A good supply of mangels is invaluable, and no other food is more successful in stimulating the milk-flow. For the best results a limited quantity should be carted to the grass paddocks daily. To turn cows into a mangel-paddock, thereby wasting about as much as they consume, is, in my opinion, the very worst policy. Even with a supply of good hay alone a herd of cows may be very successfully brought through the winter; but something more succulent is required when the cows calve early, in order to stimulate the milk-flow. For this purpose nothing is better than the mangel. In a report on last year's mangel crop that appeared in the *Journal* I made some strong statements as to

the value of the crop to this farm, and the results that I might expect from its use. It is satisfactory to be able to state that the results immediately obtained, and the results still being indirectly obtained, have more than justified every statement then made. In calculating the cost of any farm crop we are too apt to look on the immediate results only, and forget that every farm operation we carry out affects not only the present but must affect the future, and that it is a step either in the direction of success or failure, apart from the bearing it may have on the present circumstances. For this reason it is always unwise to judge of the profit obtained through any farm operation by immediate results only. There is no doubt as to the value of quick returns, but if it is the farmer's intention (as it should be) to settle down and permanently improve a farm, in every operation carried out he should have an eye to the future.

It is true that the growing of a mangel crop costs money, and, as a matter of fact, a poor crop of mangels can be grown only at a dead loss. On the other hand, no crop gives a more handsome return for liberal treatment. It is astonishing the amount of feed that may be obtained from one acre only. I am aware of the difficulties of the labour question, and the area cultivated must be determined by the labour available to cultivate that area thoroughly; but I am quite certain that the key to success in dairy-farming lies in the reduction of the areas of many of the farms and the adoption of a more intensive system of cultivation. A small farm well cultivated and carrying a small herd of high-class cows will pay handsomely and will be a pleasure to the owner, while a large area badly farmed and carrying scrub cattle is nothing but a continual worry and loss to all concerned. At the present moment there are farmers in New Zealand farming as little as 50 acres and who are making more profit than many who are farming 500.

In advocating the value of a root crop I am not overlooking the value of ensilage, but my own opinion is that in New Zealand ensilage is more valuable as a summer feed than as a winter feed, particularly in periods of drought.

Apart from the root crop or ensilage, it is quite possible to grow green feed all the year round. For winter and early spring use no feed of this class can, in my opinion, surpass tares and oats. If sown at intervals from March until July there will be a succession of crops of the highest feeding-value from the dairyman's standpoint, and no feed will produce a higher quality of butter and cheese. The growing of a legume and a non-legume together not only produces better feed for the cows, but also keeps the land in better condition. This is a very important point. Tares are also a fine weed-smotherer. We have

winter tares at Ruakura sown on the 10th May which are over 8 ft. in height; and we have one plot of 3 acres sown on the 18th October which has made phenomenal growth and is now almost ready for cutting for green feed. I am quite aware that the New Zealand dairyman is looking for a crop suitable for turning his cows on to without the trouble of cutting and leading off, but on small areas intensively cultivated this system can find no place; and the time is fast approaching when the soiling system will take the place of the present more wasteful one.

Hay made from millet is highly spoken of, and, if cut just when coming into flower, makes a nice soft hay which is relished by all stock. It also grows a very great weight per acre.

The great objection to all annual fodder crops is the labour year after year of ploughing, sowing, and reaping. On the other hand, lucerne, once well established, lasts for years; and when all other fodder crops are a failure through drought the lucerne paddock will be green and flourishing, and the farmer can "cut and come again" as often as he chooses. For winter use hay made from this plant has no equal; in fact, it is the greatest gift ever bestowed on the dairyman. It may not be possible to grow lucerne on all soils, but the experience at Ruakura points to it succeeding over a great area of New Zealand. I would advise the dairy-farmer to make every effort to establish this plant almost regardless of cost, for in it he will find a stock-food that will satisfy nearly all his requirements.

The dairy herd at Ruakura Farm of Instruction is now receiving chamois as a supplementary fodder to the rather dried-up pastures.

The work of the four main experimental farms of the Department was investigated by 712 farmers and others last month. The visitors to the different farms were as follows: Ruakura, 497; Weraroa, 95; Waerenga, 60; Moumahaki, 50.

"At the cattle show in Guernsey," writes F. G. McKay, "the dam of any bull exhibited—if on the island—has to be shown at the same time. The dam of a bull having been tested for milk and butter-fat production, a certificate of such test is taken into consideration in awarding prizes."

The last London Dairy Show brought out a very fine type of the non-pedigree milking Shorthorn—Model Maid. She gave, under the show-yard conditions, 16½ gallons of milk in two days. The percentage of butter-fat ranged from 2.93 to 4.51.

CULTIVATION OF THE VINE UNDER GLASS.

(Concluded.)

S. F. ANDERSON.

PESTS OF THE VINE.

THE most common and worst pest known to the grower of vines under glass in this Dominion is the

Mealy-bug (*Dactylopius adonidum*).

This belongs to the order *Coccidae* or scale insects. Quoting from leaflet No. 21 (T. W. Kirk, F.L.S.): "This insect is common throughout the world, and in warmer portions of the globe frequently causes extensive damage, especially to grape-vines under glass. The common name 'mealy-bug' is given because the insects (female) are more



LEAF AND SMALL BRANCH OF GRAPE-VINE.

Showing mealy-bugs on both stem and foliage. All figures natural size.
From nature.

or less covered with a yellowish-white mealy-looking powder which they throw out from their bodies, the object being principally to provide protection from enemies, but it also serves to conceal their eggs. The mealy-bug when full-grown is about $\frac{1}{8}$ in. long, being in colour white tinged with yellow, and a brown band on neck. The margins of the body are armed with a number of spines, and there are two long cottony threads extending backwards from the last segment of the abdomen. Mealy-bugs are dreaded on account of the enormous rate at which they multiply, a single female laying several hundred eggs a day."

Methods of Distribution.—Without doubt birds play a very important part in the distribution of scale insects by carrying them on their feet and legs. The young mealy-bugs are very small, and might easily be carried from their footing by a strong gust of wind and deposited some distance away. When once this insect gets into a vinery very rarely is this entirely cleared of it. Very few growers, indeed, claim to have done so. The bark of the vine, woodwork of the house, and the soil at the base of the plant afford cover for the eggs. Prevention is what must be looked to by those going in for vine-culture under glass. See that the vine-house is placed away from trees, shrubs, and hedges. Do not allow any pot-plants or creepers of any kind to be put in the vine-house. The raising of seedling plants in the vine-house, provided the boxes used are clean, may be done. Where the work of the vine-house is conducted in a methodical manner, and not too large an area is placed under the care of one man, every part comes under attention so often that the presence of any pest can or should be detected. When found it should be treated at once, and a search made for others. It has been found on the foliage at the top of the house and on no other part of the vines, proving that it can be carried by the wind.

Treatment of the Vines when the Insect has become lodged in the House.—When first discovered a small bottle of methylated spirit and brush should be kept, and diligent search made for the insect and eggs, and when found touched with the spirit. This destroys both effectively. Should, however, the mealy-bug have obtained too extensive a hold to be controlled by the above treatment, the vine-house must be fumigated with the hydrocyanic-acid gas. Before attempting to use this remedy the operator must realize that he is dealing with a very deadly gas, one or two full breaths of which would probably be sufficient to cause death. With proper precautions, however, there should be no danger in its use either to plant or man. The following directions should be carefully followed:—

Time of Day to fumigate.—Fumigate in the evening between sunset and dark. Strong light induces injury to foliage. Choose an

evening when the atmosphere is still. Never fumigate during a high wind.

Condition of Foliage and Fruit.—Do not fumigate vines in the early spring when the foliage is very tender. The fruit should be as large as small marbles, and the shoots should have hardened before the first fumigation. The plants and top soil should be dry; moisture absorbs the gas and renders the atmosphere less poisonous to insect-life. Moisture on the foliage will take up the gas, and, acting as a diluted acid, cause extensive burning of the leaves.

Fumigating-material.—The cyanide to be used must be 98 per cent. pure; lower percentages have occasioned severe burning. For every 100 cubic feet of space in the house use $\frac{1}{3}$ oz. by avoirdupois weight of cyanide of potassium, $\frac{1}{3}$ oz. by measure of commercial sulphuric acid of 1.843 specific gravity, 1 oz. of water by measure.

Method of applying the Chemicals.—Provide earthenware basins that will hold from 6 to 12 quarts according to size of house to be fumigated—a basin for every 10 ft. of the house. Divide the quantity of the chemicals by the number of basins, then place the water and sulphuric acid in the basins and put them in position. Weigh out the cyanide into pieces of paper or saucers and place one at the side of each basin. The cyanide may want breaking up into pieces; it should not be in lumps larger than a filbert nut. When all is ready and all openings closed excepting the door, commence at the far end and put the cyanide into the acid and water, taking care to keep the head away from the gas arising, and work backward and out of the door. When this is accomplished close the door and leave the fumes in one hour. When fumigating in the dormant season—viz., when the leaves are falling—the gas may remain all night. The doors and ventilators should be thrown open at the end of the hour and nobody permitted to enter the house for thirty minutes, and then with caution if the gas can be noticed.

Caution.—When breaking up or handling the cyanide on a warm evening with the hands perspiring, the hands should be washed immediately on finishing. If the quantity to be prepared is large, the hands should be washed more than once and the mouth washed out with water. In handling the sulphuric acid it should be poured into the vessels without splashing, as it will burn the hands if these come in contact with it.

Example of calculating the Cubic Contents of a House for the Quantity of Chemicals required.—Assuming the size of the house is 51 ft. long,



A FIVE-YEAR-OLD VINE.

Taken in one of the vine-houses of Mr. Thomas Waugh, nurseryman, Lower Hutt, showing the appearance of the vine-rod after pruning.

16 ft. wide, sides 3 ft. high, and the pitch of the roof 40° , the cubic content will then be,—

Body of house, 51 ft. by 16 ft. by 3 ft.	Cub. ft.
Content of roof: Draw a line across the house from top plate to top plate, and from that a vertical line to apex of roof. This will be about 7 ft. 9 in. Take the half of this and call it 4 ft. Then multiply the square of the house by 4—viz., 51 by 16 by 4.	2,448
This equals	3,264

Total cubic contents then equals 5,712

Quantity of Chemicals required.—We may call the space 5,700 cubic feet. Then, as the calculation is per 100 cubic feet, the quantity of cyanide of potassium will be $57 \times \frac{1}{3} = 19$ oz.; sulphuric acid, $57 \times \frac{1}{3} = 19$ oz.; water, 57 oz. This divided amongst five basins will give $3\frac{4}{5}$ oz. each of the cyanide and sulphuric acid and $11\frac{2}{5}$ oz. of water to each basin.

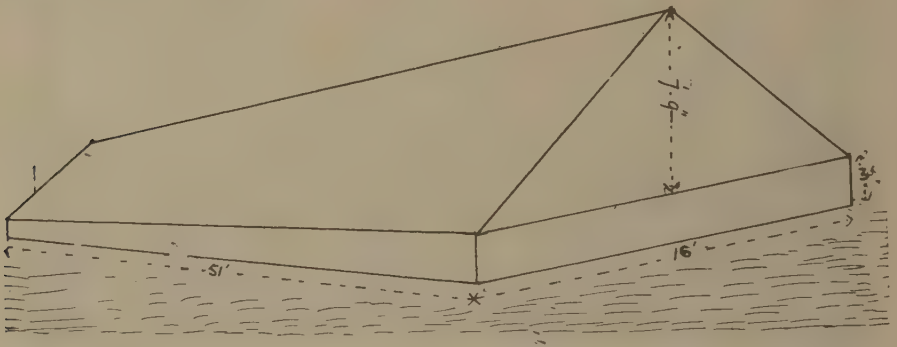


Diagram showing how the measurements are to be taken.

The fumigation does not, however, destroy the eggs, so it may be that a second fumigation will be necessary. This should be done just as the berries are beginning to colour. After the fruit has been gathered, and when slight injury to the foliage would not matter, a third fumigation, a little stronger, should be given. If the first has been found effective the second might be omitted.

The winter treatment of the vine has very much to do with success in freeing it from pests. If this work has to be summed up in one word it would be "cleanliness." Cleanliness is as essential in plant as in domestic houses. As soon as the leaves fall, the pruning is completed, and the house cleared of all rubbish—the vine-rods should have all the loose bark removed, but only that which can be easily



A WELL-GROWN VINE.

Taken in one of the vine-houses of Mr. J. Longton, Candilli Vineyard, Ferry Road, St. Martin's, Christchurch.

rubbed off with a bit of sacking or coarse glove. There should be no scraping when doing this. Keep a good lookout for any deposit of mealy-bug eggs. These are easily detected by the white patch of cottony material, and should at once be destroyed by touching with methylated spirit. It would be well when rubbing off the loose bark to have old newspapers spread under the vines to catch the rubbish. When the work has been finished these can be burned, so that eggs that escape notice may be caught and destroyed. When this has been done the house should be washed down with hot water if possible. If this cannot be obtained use cold with a good pressure behind it, but the vine-rods should have the water hot. No harm will come from this, and no insects or eggs can stand it. The vine-rods should now be painted with the following: Get a quantity of good plastic clay and dry it thoroughly, then powder it up so that it can pass through a $\frac{1}{4}$ in. sieve; measure off with a 6 in. flower-pot nine potsful of the dry sifted clay, and mix thoroughly through it one flower-potful of coal-tar. Place in a small tub and bring up to the consistency of paint with hot water, and keep well stirred while in use. Put on with a stiff brush, taking care not to scrub the buds, but just dab round them. When the rods have dried they may require looking over again, and any part that has been missed can then be treated. This clay and tar mixture has given excellent results. A word of caution is necessary here. It must be made with a good plastic clay. Ordinary soil or any containing too much sand or soil will not do. Should the proper clay not be obtainable, use a mixture of 8 oz. of Gishurst's compound to a gallon of water, with clay added to give it the consistency of paint, and apply with a brush. Another good paint for this purpose is made as follows: 4 oz. soft-soap, 4 oz. nicotine, 4 oz. Little's sheep-dip, 2 oz. turpentine, and add sufficient sulphur to form a thick cream. Dissolve the soft-soap in hot water, then stir in the other ingredients and make up to 1 gallon of the mixture. Apply with a brush.

Mildew.

The next most serious pest is the mildew (*Oidium Tuckerii*). The spores of this disease seem to be always present, only requiring the conditions favourable to development to be seen on the under-side of the leaves in small round grey patches, which can be detected more clearly when held up to the light. It spreads to the young fruit and growing tips with astonishing rapidity. Like almost all of our fungoid diseases, if the grower waits until he can see it much injury may have been done. Prevention, then, is most important in order to keep the house free. As soon as the vines have started into growth dust lightly but thoroughly with sulphur on a cloudy day when the house is cool and the foliage dry. Three or more dressings will be



A FINE VINERY IN FULL BEARING, TAKEN IN ONE OF MR. THOMAS LEE'S HOUSES, WHANGAREI.

required during the season. The earlier ones are the most important. Sulphuring the vines should never be omitted.

Red Spider (Bryobia pratensis).

This tiny sucking insect is capable of doing considerable mischief if allowed to multiply. When numerous its presence will be indicated by the brown or rusty appearance of the foliage. Examination of the under-sides of the leaves will show the pest in various stages of existence. Usually along the midribs the brown- to red-coloured eggs as well as the adult spiders will be seen. This insect may always be expected to make its appearance during dry seasons or in houses that are allowed to become too dry. When a daily syringing of the foliage is carried out, as recommended under the head of "Syringing the Vine," the chances are that it may never make its appearance, as it does not like moisture.

Thrip (Thrips minutissima).

This insect is also found in the vine-houses of the Dominion. The same conditions that favour red spider also encourage thrip. These are not easily seen, and may disfigure the fruit a good deal before being noticed, particularly that of the late kinds, such as Gros Colman. If the house is regularly syringed these insects do not often get a firm hold.

SCALDING OF THE LEAVES.

This is a very common trouble in the cultivation of vines under glass in the Dominion. It may also occur on the fruit. It is due to improper ventilation. A delay in opening the ventilators on a summer's morning and a hot sun coming on the moisture-laden leaves is the chief cause. When spraying the vines in the afternoon the top ventilators should be open to permit free circulation of the air to dry the vines again. It has been already stated under the head of "Ventilation" that there should always be some circulation of air, and where this is attended to the chances of scalding are greatly reduced.

OVERCROPPING.

Overcropping is the cause of much of the trouble met with by the vinegrower. It weakens the vine by giving it too much to do. The fruit cannot colour properly, and the effect it has on future crops for several seasons is very marked. Weakening a plant by overbearing is much more far-reaching in its effects than many vinegrowers suppose. It has somewhat the same effect as over-defoliating, which may be described as a slow starvation of the plant. To obtain fruit perfect in colour and size should be the aim of every grower, and it is possible to do this every year if the foundation of the plant is well established and careful culture maintained in after-years.

SILVER-BEET.

FEEDING-TESTS AT BELFAST FREEZING-WORKS.

A. MACPHERSON.

AMONGST tests conducted in co-operation with the Department by the Canterbury Frozen Meat Company at its Belfast works last season was one to demonstrate the possibilities of silver-beet as a feed for sheep. The report of the works-manager, Mr. Hopkins, already published in the *Journal*, shows that the crop was greedily eaten by the sheep, which thrived well upon it. The feeding-off results are now available. These show that the carrying-capacity was at the rate of 828 sheep for seventy days. Following are the results :—

First feeding-off, March : The quarter-acre carried 85 sheep for ten days. The sheep were turned in on the 12th March, and were taken off on the 22nd March. Thus 1 acre would carry 243 sheep for fourteen days. On the 12th March the first stripping of leaves was made. It indicated a yield of 51.72 tons per acre.

Second feeding-off, July : The quarter-acre carried 50 fat lambs for fifteen days. The lambs were turned in on the 30th June, 1912, and were taken off on the 13th July. Thus 1 acre would carry 214 lambs for fourteen days. The second stripping of leaves was made on the 30th June. It indicated a yield of 48.22 tons per acre.

Third feeding-off, September : The quarter-acre carried 50 sheep for twelve days. The sheep were turned in on the 2nd September, and were taken off on the 13th September. Thus the 1 acre would carry 171 sheep for fourteen days. The third stripping of leaves was made on the 2nd September. It indicated a yield of 30 tons per acre.

Fourth feeding-off, November : The quarter-acre carried 50 sheep for seven days. The sheep were turned in on the 2nd November, and were taken off on the 9th November. Thus the 1 acre would carry 100 sheep for fourteen days. The fourth stripping of leaves was made on the 2nd November. It indicated a yield of 27 tons per acre.

Fifth feeding-off, December : The quarter-acre carried 50 sheep for seven days. The sheep were turned in on the 24th December, and were taken off on the 31st December. Thus the 1 acre would carry 100 sheep for fourteen days. The fifth stripping of leaves was made on the 5th December. It indicated a yield of 26.86 tons per acre.

LUCERNE ON PUMICE SOIL.

THE photograph on the accompanying page illustrates the growth of lucerne on typical poor pumice country at the experimental plots of the Department at Lichfield, on the Rotorua line. The history of these plots was given in the *Journal* of last December. The larger sample illustrated shows the growth made between the 16th December and the 25th January of this season, or forty days. The lucerne was really ready for cutting in twenty-one days. The plot had been previously cut on the 16th December, and the lucerne made into hay. The smaller growth was from a plot sown on the 16th November, 1912, and the plants illustrated show two months' growth from seeding.

RESIN AND SODA.

SUMMER SPRAY FOR WOOLLY APHIS.

J. A. CAMPBELL.

If left unchecked, the effects of a bad attack of woolly aphis during the summer are only too well known, causing as it does the destruction, or at least retarding the development, of the buds on the new growths and fruiting-wood of the tree; but when thoroughly checked during January or February the damage is considerably lessened.

The following spray, made of resin and soda, will do this very effectually, and, although not a new spray, it is one that, were it better known, I feel sure would be more generally used at this season.

Proportions: 5 lb. washing-soda, 5 lb. resin, and 40 gallons of water.

Preparation: Boil 2 gallons of water in a vessel of more than twice that capacity. In this dissolve 5 lb. of soda, then add 5 lb. of resin, and boil until the resin is dissolved, stirring well. As the mixture very readily foams over, it is necessary to have some cold water at hand to add from time to time, to prevent this. Continue to boil until all foaming ceases. Make up to 40 gallons. If used early in the summer this spray is apt to scorch, but it can be safely used from January onward.

The Japanese forage plant, polygonum, has been tried on all classes of stock at Ruakura Farm of Instruction, but in every case the animals refused to eat it. The experience was similar with the young shoots of helianthi.



LUCERNE GROWN ON PUMICE SOIL.

CEREALS AT RUAKURA.

A. W. GREEN.

As stated in previous reports, barley and rye are cereals which admirably suit the soil and climate of the Waikato. They succeed where oats fail, and, by choosing a suitable strain, no difficulty should be experienced in obtaining a good crop. Neither of them are affected to any extent by rust, and they thrive under the most variable conditions. The old Chevalier, a standard variety, has this season given an excellent crop. It may be outclassed in weight by Maltster when threshing is done, but for a clean, even crop it is hard to beat. The two Swedish barleys, Primus and Hennen, are not as good as expected. Primus is by far the better of the two, but has not yielded equal to the crops produced by either Chevalier or Maltster. The Swedish types were also more affected by smut.

Excelsior barley, a six-rowed variety, yielded better than either Cape or Six-rowed Winter. The area sown was small, on account of a limited amount of seed, so that it will take another season to test its real value.

With rye, Emerald yields longer and heavier heads than ordinary rye-corn. The average height of the former is 6 ft., and the straw is of a superior quality.

Wheats have given better results this season, the plots clearly demonstrating what varieties will succeed in these soils and environment. The crop of Solid Straw Tuscan fills first place, followed by White and Red Straw Tuscan. Marshall's No. 3 also holds a high place. Amongst the bearded wheats, Rieti takes the lead, and some selections made from this variety this season give promise of greatly improving the yield of the variety.

Wherever possible, selections were made from successful varieties. Velvet, Pearl, and Grenadier were varieties which failed to give a crop worth harvesting.

The plots of oats did not give such good results as those of other cereals. *Helminthosporium graminum* attacked them badly early in the season, and later on rust appeared. The Swedish oats took rust far worse this year than last season, and prove unsuitable for this district. Black Bell is the best variety amongst them. This also led last year. Although twenty-five varieties of oats were under trial in the Ruakura Farm of Instruction plots, there were only two which could be relied on to yield payable crops—namely, Ruakura Rust-resisting and Algerian. Hative de Mesday is the best of the new oats, but it takes rust badly, and is rather weak in the straw.

CALIFORNIAN - THISTLE SEED.

THE QUESTION OF GERMINATION.

A. H. COCKAYNE.

QUITE a general impression exists among farmers, more particularly in the South Island, that the seed of Californian thistle will not germinate, especially that found in imported lines of agricultural seeds, notably alsyke. Recently . Degegen, of the Buda-Pesth Seed-control Station, sent me Californian thistle seed taken from a European grass-seed sample, to ascertain if they would germinate on arrival in New Zealand. The seed was put to germinate, and 25 per cent. sprouted within twenty-one days. This definitely shows that the presence of Californian thistle in imported seed is a distinct menace. With regard to the seed of the New Zealand Californian thistle, this germinates quite freely under the ordinary methods employed for the determination of the vitality of seeds. It is significant that the impression that Californian-thistle seed will not germinate in New Zealand invariably prevails in districts where the weed is most prevalent. Is it that the wish is father to the thought?

MANURING : THE IMPORTANCE OF APPLYING ARTIFICIALS BELOW THE SEEDS.

THE obvious fact that artificial manures are more effective when placed below the seed than when applied on the surface of the soil is being demonstrated at Ruakura Farm of Instruction at the present time in connection with several forage-crop experiments. The effect is most striking with a crop of peas and millet where the manure was applied by means of an ordinary grain-drill below the seed and at the same time, the growth (dense and vigorous) is excellent, being fully three times the weight of the crop grown where the manure was broadcasted on the surface and the seed afterwards drilled in. Not only this, but only half the manure was used where it was drilled in below the seed. In an experimental mangel crop the great advantage of drilling in the manure is also strikingly demonstrated.

Splendid crops of red clover are to be seen throughout the pumice country this season—in the Lichfield, Putaruru, Okoroire, and Rotorua districts. Large well-saved stacks of the valuable red-clover hay are to be seen in many places.

REGISTRATION OF MILKING SHORTHORNS.

E. CLIFTON.

THE capacity of the Shorthorn cow for the milking type is so well known that it may well be asked, Why is there no breeders' society and its herd-book of these cattle?

The far-reaching effect of the Shorthorn Breeders' Society of Great Britain is well known, and its herd-book is the pioneer of stock registers. It may be claimed that the New Zealand Society of Breeders of Shorthorns is sufficient; but this society and its herd-book are concerned chiefly in the registration of stock of pure descent: it must also be accepted that this is more in the interests of the grazier than of the dairy-farmer.

It must appeal to the lover of the Shorthorn—it remains in the memory of many of us—that in the earlier days of the colony the Shorthorn cow, big enough for a bullock team, was a deep milker; and she may still be found on station and on farm. Can there not then be formed a society for the encouragement of the breeding and for the registration of such cattle? In Great Britain itself, in Australia, and in America, the milking Shorthorn breeders' associations with their herd-books are in being. Our country is not usually a laggard in societies, associations, and unions. Does not this offer a useful field for another society? There is good warrant for the recognition of the value of the Shorthorn on the dairy farm. In New Zealand are many herds of cows of great milk-producing capacity that are to all intents and purposes true Shorthorns. They may be described as unregistered. It is the owners of these cattle who should associate their interests and register their stock. This would increase the value of such herds; the stock would be known. It would also obviate the difficulty, well known to breeders of this type of cattle, when a bull is wanted of knowing where to find it.

A well-known dairy-farmer whose herd is Shorthorn was quite recently asked, "Where can a bull of a milking family of this breed be purchased?" The reply was, "I do not know; you must do as I have to do: When I replace a bull I take my chance." Surely this should be altered. A society of breeders of this type of Shorthorns should be formed.



THE NON-PEDIGREE SHORTHORN DAIRY COW DOT.

Having probably the most remarkable show-yard record in England of any animal of her type.

The admission of stock to the register would depend on the production of a defined quantity of milk, and the conformance of the individual to the Shorthorn type. At present the herd-book of this breed is a valuable guide to the grazier; there the descent of stock famous in the show-yard can be traced, and the selection of sires and cows for the production of stock for the fattening-paddock can well be made; but there is no guide to the cow or the bull for the dairy farm. It is the utility cow that is in demand, and there are farmers who believe this to be in the stock of the Shorthorn type.

It is suggested that the dairy-farmers who may approve of the proposal to form a milking Shorthorn breeders' society should move in the direction of forming a society on the lines of the Ayrshire, or Holstein, or Jersey societies. The next large gathering of farmers will be at the winter shows of Dunedin and Manawatu. Possibly some one interested will there propose and arrange to form a society of breeders of milking Shorthorns.

In making this proposal it is not intended to recommend or disparage any breed of dairy stock, still less is it intended to enter upon the topic of dual or special-purpose cows: it is that there are many who prefer to breed the Shorthorn, and registration, under the auspices of a society, would materially assist such dairy-farmers.

International Agricultural Exhibition at Ghent in 1913.—The International Agricultural Exhibition which is to be opened at Ghent on the 26th April, 1913, promises to make an unusually strong appeal to every one interested in agriculture and country life generally. A very large undertaking in connection with the Exhibition is to be an "ideal village." From an English point of view the dairies will probably be the most interesting part of the display. There will be one in each of two farms of the village, and also a co-operative dairy on a larger scale fitted with the very latest machinery and according to the most recent ideas. The farms will also be stocked with animals and machinery, while a series of competitions in shoeing and the repair of farm implements will be held at the blacksmith's shop of the village. Horse and cattle shows and ploughing-competitions will also be held during the run of the Exhibition. Beside the actual village buildings, a number of halls for the display of agricultural machinery have been built. The Ghent Exhibition as a whole covers, roughly, 250 acres (about 50 acres more than the Brussels Exhibition), and will be the most important one since the Paris Exhibition of 1900. The English pavilion will be practically filled with a machinery exhibit. The twentieth International Congress on Agriculture will be held at the Exhibition from the 8th to the 13th June, under the patronage of the King of Belgium.—*The Journal of the British Board of Agriculture.*

CHEESE.

EXAMINATION FOR CONTENT OF MOISTURE AND FAT.

(Concluded.)

W. E. Gwillim.

THE data given in the three lists* of cheese examined should make the matter almost self-explanatory, and, as the work of examination is proceeding with the season, discussion at this stage may be limited to a few features.

The chief characteristic which distinguishes Cheddar cheese from other varieties of "hard" or pressed cheese is a certain firmness, closeness, and mellowness of body accompanied by a particular flavour, derived principally from a small amount of the sugar of milk converted into lactic acid. This certain amount of acid is essential to every Cheddar cheese, and when it is present the cheese is described as "normal for acid." A well-made cheese, normal for acid, made from pure and sound whole milk of clean flavour, requires only proper curing to develop the requisite flavour and mellowness of body.

In the making of cheese under normal conditions the whole of the fat, casein, and other cheesemaking solids of the milk, less a small and nearly uniform percentage which is mechanically and unavoidably lost, go almost automatically into the resultant cheese, therefore one of the chief aims of the cheese-maker in his work of making cheese of the quality in demand is directed to controlling the content of acid and moisture.

The information in the lists of examinations will help to demonstrate to a certain extent how successful or otherwise the various cheese-makers concerned have been in their efforts to efficiently produce good cheese from the raw material supplied to them.

For a cheese to be of good body and texture and just what the market requires does not necessarily mean that the two chief constituents which give to cheese a rich and mellow quality—viz., fat and moisture—must always be present in the same ratio. The ratios vary. Sometimes the percentage of fat exceeds that of the moisture, sometimes the reverse, and, again, the percentages may be about even. This feature is peculiar to Cheddar cheese, and has been so ever since

* See last month's *Journal* for Lists A and B.

Cheddar cheese has been made and reports on quality and analysis for constituents recorded. These variations still obtain. Three instances may be noted in the present examinations, viz,—

(1.)	Factory	9	in list A :	37.7	per cent. moisture,	33.2	per cent. fat.
(2.)	"	76	"	B :	33.6	"	36.8
(3.)	"	85	"	B :	36.0	"	36.0

The body and texture of these cheese left very little to be desired.

In this connection it is worth remarking that the first of the three is nearly 1 per cent. above the average for moisture-content, and a shade below the average fat-content of the average of the sixty cheese in the list in which it is included.

In list A the average moisture-content is 36.85 per cent., and in 95 per cent. of the cheese the moisture is between 35 and 38 per cent. The average fat-content is 33.64 per cent., and in 75 per cent. of the cheese the range is between 32 and 35 per cent.

In list B the average moisture-content is 36.25 per cent., and in 83 per cent. of the cheese the range is between 35 and 38 per cent. The average fat-content is 33.78 per cent., and in 81 per cent. of the cheese the range is between 32 and 35 per cent.

In list C the average moisture-content is 36.06 per cent., and in 66 per cent. of the cheese the range is between 35 and 38 per cent. The average fat-content is 33.73, and in 75 per cent. of the cheese the range is between 32 and 35 per cent.

The cheese in this list are of indifferent make, and 27 per cent. were graded second-grade on account of defects in body and texture. A comparison of the summary of these cheese with the summaries of the others is not of much value, as the cheese do not represent an average of the quality of cheese exported. The first grades are of a quality which is not appreciated very highly, and the second grades are such as the market would be the better for being without. It may, however, be noted that the average moisture-content is lower than in the other summaries, and fat-content is about the same. There is a wider range in the moisture-content. In one instance the moisture is over 39 per cent. and the body and texture was soft, sticky, and acid cut. This cheese is worth less commercially than a well-made cheese; also, it is probable that the extra loss of cheesemaking solids which took place in the making would not be counterbalanced in weight by the presence of the extra amount of moisture over that in an average cheese.

With regard to the variations in the fat and moisture content of all the cheese examined, it may be mentioned that the cheese were not

of exactly the same age, and if they had been the variations would have been within narrower limits.

It will be noted that some cheese are remarked on as "green" or "on green side." It is to be regretted that cheese which are still in a more or less curdy condition are forwarded for shipment. When in this condition the cheese have still to lose a certain amount of moisture, and, although the shipper may be credited with more weight than if the cheese were in a proper condition for shipment, the receiver will get less weight of cheese than he is honestly entitled to and a class of cheese which he will have to hold until the greenness disappears. The practice of shipping green cheese is reprehensible, and one which is easiest to find out. Fortunately for the good of our reputation the practice is indulged in by only a small minority of the shippers.

With regard to the value of a knowledge of the component parts of the cheese at the time of grading, it is not apparent from the results of these examinations that the knowledge would be of any practical value to the grader. A cheese is judged according to its merits as a cheese. The component parts are necessarily within narrow limits. Just what the ratio of these different parts is depends largely on the skill of the maker, the care of the cheese from the time of making to the time of judging, and, in a less degree, on the age of the cheese and the ratio of the cheesemaking solids in the milk from which it was made.

A further factor, and perhaps one as valuable as all the others put together, and one that exerts a dominating influence at all stages in the making and at all times in the life of the cheese, is, in the first place, the condition of the milk in respect to its freedom or otherwise from impurities and undesirable flavours. A good cheese, well made and well cared for, contains all the available cheesemaking solids of the whole milk, and combined with this matter is that percentage of moisture necessary to its perfection. This percentage of moisture is no specific or arbitrary amount, and never has been and probably never will be. In the sixty well-made cheese examined in list A the average moisture-content was 36.85 per cent., and the content ranged in individual cheese from 35.0 to 38.2 per cent.

LIST C.

Particulars of forty-one samples of cheese examined for content of moisture and fat, ex lots from twenty-one factories graded at grading-ports as stated, and shipped by various Home-going steamers which sailed 17th October to 24th December, 1912, inclusive. Cheese scoring 27 points and over for body and texture are first grade; below 27 points are second grade.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Notes at Time of Sampling.		
				Age, Days old.	Points for.	Body and Texture. Remarks on.

TESTED TO 17TH OCTOBER, 1912.

Graded at Wellington.

	Per Cent.	Per Cent.	Per Cent.			
89	32.3	34.0	33.7	..	27	Too firm, harsh, close.
89	33.8	34.8	31.4	..	27	Too firm, harsh, close.
89	33.6	33.6	32.8	..	27	Too firm, harsh, close.

TESTED TO 1ST NOVEMBER, 1912.

Graded at Wellington.

75	37.2	34.8	28.0	..	27½	Little pasty.
56	34.8	36.8	28.4	..	26½	Harsh, sweet, pinholey.
90	35.6	32.8	31.6	..	26	Acid cut.

TESTED TO 16TH NOVEMBER, 1912.

Graded at Wellington.

2	38.1	33.6	23.3	..	27	Pasty, loose.
91	36.0	33.6	30.4	..	27	Sweet holes, smooth.
91	34.6	34.0	31.4	..	27	Dry, acidy.
92	37.2	33.2	29.6	..	26½	Green, weak, acidy.
93	36.0	34.4	29.6	..	27	Green, harsh.
94	37.0	34.4	28.6	..	27	Pasty.

TESTED TO 28TH NOVEMBER, 1912.

Graded at Wellington.

2	37.7	32.4	29.9	..	27	Pasty, loose.
95	36.0	34.0	30.0	..	27½	Sweet, on firm side, close.
96	35.2	34.4	30.4	..	27½	Little stiff and open.
51	39.5	32.4	28.1	..	26	Acid cut, soft, sticky.
97	38.0	32.8	29.2	29	26	Acid cut, soft, sticky.
49	37.4	31.2	31.4	..	27	Sweet holes, smooth.
89	32.4	36.0	31.6	35	26½	Stiff, dry.

Graded at Patea.

98	37.5	34.0	28.5	29	26	Green, harsh, acid cut.
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TESTED TO 11TH DECEMBER, 1912.

Graded at Wellington.

2	38.0	32.0	30.0	15	27	Weak, loose.
2	37.6	32.0	30.4	17	27	Weak, loose.
2	39.0	31.8	29.2	16	27	Weak, loose.
94	35.8	34.0	30.2	21	27	Weak, little sweet.
99	35.6	32.0	32.4	17	27	Dry, mealy.
99	34.8	32.8	32.4	24	27	Dry, mealy.
100	33.6	34.4	32.0	24	27	Dry, too firm.
92	35.4	34.6	30.0	..	26	Acid cut, dry, greasy.
92	35.8	34.0	30.2	..	26	Acid cut, dry, greasy.

Graded at Patea.

70	37.9	30.8	31.3	25	26	Acid cut, soft, sticky.
----	------	------	------	----	----	-------------------------

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Notes at Time of Sampling.	
				Age, Days old.	Body and Texture.
					Points for.
					Remarks on.

Graded at Lyttelton.

	Per Cent.	Per Cent.	Per Cent.			
101	33.2	34.8	32.0	..	27	Too firm, dry, close.

TESTED TO 27TH DECEMBER, 1912.

Graded at Wellington.

1	37.4	31.2	31.4	12	26	Green, harsh, greasy.
2	38.0	33.2	28.8	24	27	Weak, loose.
13	37.8	31.2	31.0	26	27	Weak, loose.
94	32.8	34.4	32.8	16	27	Green, mealy.
94	33.6	32.4	34.0	12	27	Green, dry.
94	35.2	34.4	30.4	11	27	Green, mealy.
94	35.3	33.6	31.1	10	27	Green, mealy.
94	36.0	34.4	29.6	10	27	Green, mealy.

Graded at New Plymouth.

102	38.0	34.0	28.0	26	27	Weak, sticky.
85	37.8	33.6	28.6	23	27	Weak, sticky.
Average	36.06	33.73	30.21	..	..	

SUMMARY OF PERCENTAGES.

LIST A.

Moisture-content.

Highest.		Lowest.		Average.
33.2	..	35.0	..	36.85
Range.		No. of Samples.		Per Cent.
34.0 to 35	..	1	..	1.67
35.1 to 36	..	11	..	18.33
36.1 to 37	..	25	..	41.66
37.1 to 38	..	21	..	35.00
Over 38	..	2	..	3.34
		60		100.00

Fat-content.

Highest.		Lowest.		Average.
36.8	..	31.2	..	33.64
Range.		No. of Samples.		Per Cent.
31.0 to 32	..	6	..	10.00
32.1 to 33	..	12	..	20.00
33.1 to 34	..	27	..	45.00
34.1 to 35	..	6	..	10.00
35.1 to 36	..	8	..	13.33
Over 36	..	1	..	1.67
		60		100.00

LIST B.

Moisture-content.

Highest.		Lowest.		Average.
38.8	..	33.4	..	36.25
Range.		No. of Samples.		Per Cent.
33.0 to 34	..	2	..	1.90
34.1 to 35	..	12	..	11.43
35.1 to 36	..	30	..	28.57
36.1 to 37	..	36	..	34.29
37.1 to 38	..	21	..	20.00
Over 38	..	4	..	3.81
		105		100.00

Fat-content.

Highest.		Lowest.		Average.
36.8	..	30.4	..	33.78
Range.		No. of Samples.		Per Cent.
30.0 to 31	..	2	..	1.90
31.1 to 32	..	3	..	2.86
32.1 to 33	..	21	..	20.00
33.1 to 34	..	42	..	40.00
34.1 to 35	..	22	..	20.95
35.1 to 36	..	14	..	13.34
Over 36	..	1	..	0.95
		105		100.00

LIST C.

Moisture-content.

Highest.		Lowest.		Average.
39.5	..	32.3	..	36.06
Range.		No. of Samples.		Per Cent.
32.0 to 33	..	3	..	7.32
33.1 to 34	..	5	..	12.19
34.1 to 35	..	3	..	7.32
35.1 to 36	..	12	..	29.27
36.1 to 37	..	1	..	2.44
37.1 to 38	..	14	..	34.15
38.1 to 39	..	2	..	4.87
Over 39	..	1	..	2.44
		41		100.00

Fat-content.

Highest.		Lowest.		Average.
36.8	..	30.8	..	33.73
Range.		No. of Samples.		Per Cent.
30.0 to 31	..	1	..	2.44
31.1 to 32	..	7	..	17.07
32.1 to 33	..	6	..	14.63
33.1 to 34	..	14	..	34.15
34.1 to 35	..	11	..	26.83
35.1 to 36	..	1	..	2.44
Over 36	..	1	..	2.44
		41		100.00

FRIESIAN MILKING-CATTLE.

J. LIGGINS, Tokomaru.

It is difficult to one who has visited the home of the Friesian cattle, and has studied the breed in its native habitat, to understand why the owners of the famous black-and-whites in this country and their breed association should describe these cattle as Holstein-Friesians. Apparently without due consideration we have followed the lead of American breeders in this respect. While the Americans may have imported from Holstein—now a province of Germany but formerly a portion of Denmark—the names given in American pedigrees lead one to believe that the foundation cattle were really imported from Friesland, the northern portion of Holland, in the vicinity of the Zuyder Zee. For instance, we have Colantha, Johanna, Pietertje, and other Dutch names too numerous to mention here. The English Holstein Cattle Association probably did import their cattle from Holstein, an impression borne out by the absence of pedigrees in their herd-book, which in no case gives any ancestry beyond the dam and sire; whereas if the stock had been purchased in Friesland they would have been able to furnish extended pedigrees, for the Frieslanders are most careful in preserving the pedigrees of their cattle. Our nomenclature is the more surprising when it is remembered that the foundation animals of the oldest herd of black-and-whites in New Zealand were imported from the vicinity of Leeuwarden, North Friesland. It is true that since then many American animals have been imported, but at the time of the inception of the New Zealand Holstein-Friesian Association it is fairly safe to say that the Grigg cattle predominated in New Zealand; and even now the fine herd at Weraroa Experimental Farm possesses many of the large, roomy, beautiful types of the original Grigg cattle. Indeed, from my personal observations in Friesland, the type of Domino is the true type of the Frieslander of the present day. In saying this I have no desire to depreciate American importations as a whole; still, there have been importations from America that would have been improved if, in addition to milking characteristics and milking records, they had demonstrated better care on the breeder's part in obtaining a larger type of cow. With proper care we certainly can attain in time the desired type with our present stock. Of course, the simplest way to this end would be the importation of stock from Friesland. Unfortunately, at the present day the necessary quarantine restrictions prevent this. It



ONE OF THE BEST TYPES OF FRIESIAN COWS.
Friesland photograph.

is sincerely to be hoped, however, that it will be possible in the near future to secure the stock we so much desire.

It is not generally known in this part of the world that the Friesian breed has a great antiquity. It possesses a history dating well back two thousand years, and is directly descended from the cattle owned by the Friesians and Batavians, the earliest record of which is dated three hundred years before Christ, the Roman Tacitus mentioning the cattle of the Friesians. Since that time the stock has been kept absolutely pure. Living up to the present day under the same roof as that of the homestead, the cattle are most docile. It is no uncommon sight to see them being quietly milked in the open, and to see them removed from one pasture to another by means of small boats. Large open drains separate the fields, and the cattle are never known to cross on their own account. It is the manner in which they have been handled for two thousand years that has produced the docile and valuable animal of the present day. The good qualities of the breed have been developed in many distant parts of the world to which they have been exported. It is evident, however, that their best characteristics are maintained to a higher degree in the country of their origin. The conditions under which the cattle are there bred warrant this assertion. Grazing as they do on the richest low-lying pastures of the world, they develop large frames and a capacity for heavy milk-production, while their ancient lineage enables them to transmit their good qualities to their offspring. Their prepotency is great—so great, indeed, that cross-breeds exhibit the black and white colour for generations.

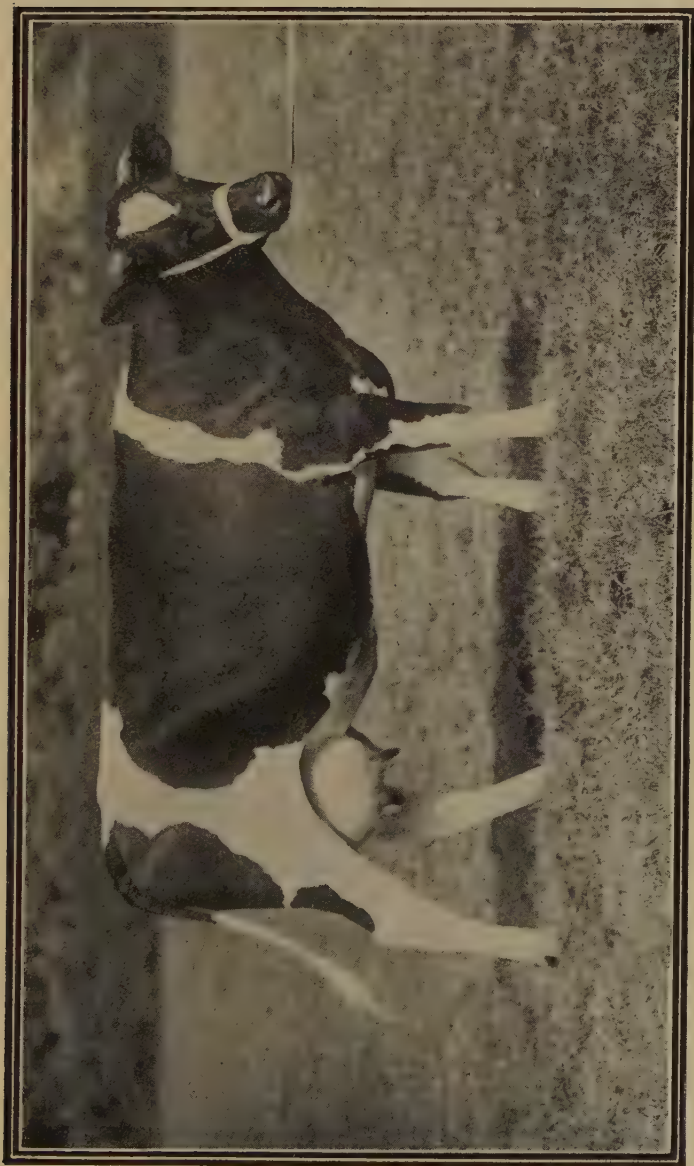
In a class of seven in a dairy-cattle-judging competition at the recent Horowhenua Show, cadets from the Weraroa Experimental Farm occupied the first, second, and third positions.

During the last six months of 1912 the British Government spent in compensation in consequence of foot-and-mouth disease in England and Wales a sum approximating £52,000.

Mr. J. T. Shepherd, Manager of the Waerenga Experimental Farm, who possesses the power of water-divination, has recently investigated Central Otago country in this connection. He has found that over the greater part of Central Otago there are strong indications in many localities of the presence of underground water. In more than one place huge volumes of subterranean water were located.



KONINGIN, A GRAND OLD FRIESIAN COW.
Friesland photograph.



AN ATTRACTIVE FRIESIAN HEIFER.

Friesland photograph.

QUALIFIED VETERINARY SURGEONS.

NEW ZEALAND LIST.

FOR the guidance of stockowners and for general information it is proposed to publish in the *Journal*, at six-monthly intervals, a list of qualified veterinary surgeons known to be residing in New Zealand. Following is the first list.

In the event of the name of any properly qualified veterinarian being omitted, it is requested that he communicate with the Editor, giving particulars of his qualification, in order that the necessary steps may be taken for the inclusion of his name in the next published list.

- Ashe, G. G., M.R.C.V.S., Timaru.
- * Barnes, A. W., M.R.C.V.S., Hastings.
- Begg, W. P., M.R.C.V.S., Ashburton.
- * Blair, W. D., M.R.C.V.S., Dunedin.
- * Blake, T. A., M.R.C.V.S., Tokomaru Bay.
- Brodie, A. M., M.R.C.V.S., Hastings.
- * Broom, George, M.R.C.V.S., Waitara.
- * Burton, S., M.R.C.V.S., Gisborne.
- Charlton, J. R., M.R.C.V.S., Christchurch.
- * Clayton, J. G., M.R.C.V.S., Wellington.
- Cockcroft, J. E., M.R.C.V.S., Palmerston North.
- * Collins, W. T., M.R.C.V.S., Hamilton.
- Crossley, F., M.R.C.V.S., Wellington.
- * Cunningham, T., M.R.C.V.S., Oamaru.
- Danskin, J., M.R.C.V.S., Balclutha.
- Edgar, P. M., M.R.C.V.S., Wanganui.
- Edwards, W. W. H., M.R.C.V.S., Christchurch.
- * Elphick, E. E., M.R.C.V.S., Christchurch.
- * Finch, R., M.R.C.V.S., D.V.S.M., Auckland.
- Glover, F., M.R.C.V.S., Hamilton.
- Hamilton, A., M.R.C.V.S., Musselburg, Dunedin.
- * Hickman, A. J., M.R.C.V.S., Auckland.
- * Howard, E. C., M.R.C.V.S., Wellington.
- * Johnson, A. A., M.R.C.V.S., Christchurch.
- * Kerrigan, J., M.R.C.V.S., Wallaceville.
- Lilico, T. G., M.R.C.V.S., Christchurch.
- * Lyons, J., M.R.C.V.S., Auckland.
- McLeod, J., M.R.C.V.S., Christchurch.
- Machattie, D. H., M.R.C.V.S., Leeston, Canterbury.
- Marquis, N., M.R.C.V.S., Waimate, South Canterbury.
- Martin, H. E., M.R.C.V.S., Gore.

* Members of the Live Stock and Meat Division, Department of Agriculture, Industries, and Commerce.

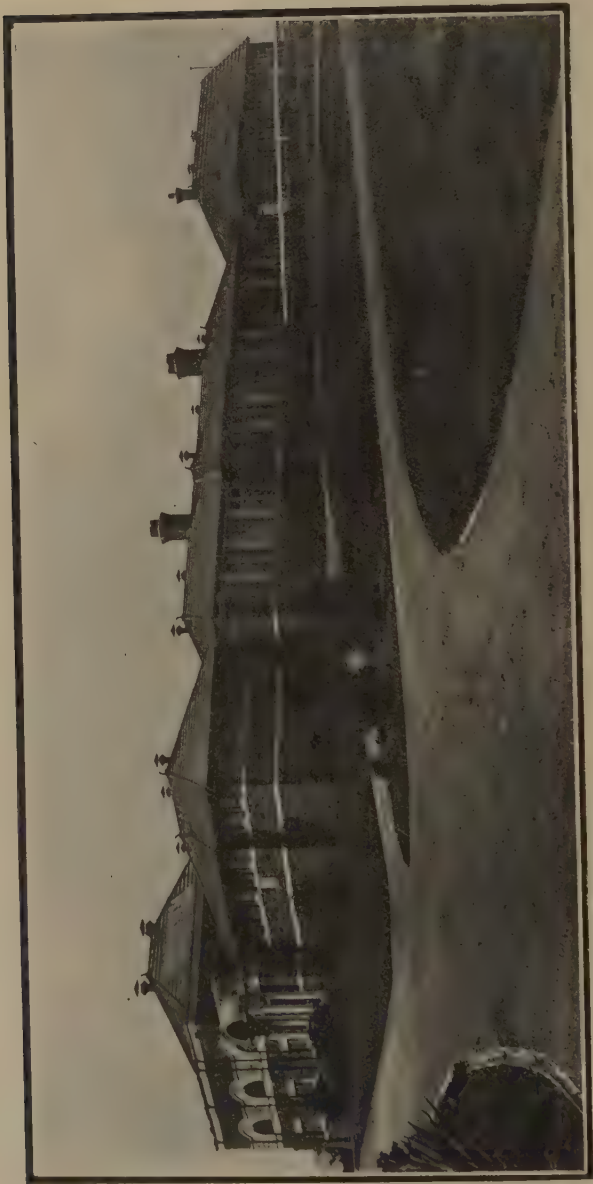
Miller, W. J., M.R.C.V.S., Invercargill.
 Neale, C. R., M.R.C.V.S., Hawera.
 * Paterson, A. M., M.R.C.V.S., Timaru.
 * Primmer, J. H., M.R.C.V.S., Palmerston North.
 Quinnell, W. C., M.R.C.V.S., Wellington.
 Rait, D. H., M.R.C.V.S., Palmerston North.
 * Reakes, C. J., D.V.Sc., M.R.C.V.S., Wellington.
 * Reid, H. A., F.R.C.V.S., D.V.H., Wellington.
 Robertson, F. C., M.R.C.V.S., Ashburton.
 Robertson, F., M.R.C.V.S., Oamaru.
 Simpson, C. S., M.R.C.V.S., Parnell, Auckland.
 * Snowball, W. D., M.R.C.V.S., Dunedin.
 * Spilman, D., M.R.C.V.S., Wellington.
 * Stafford, J., M.R.C.V.S., Christchurch.
 Taylor, A., M.A., M.R.C.V.S., Lincoln, Canterbury.
 * Taylor, W. G., M.R.C.V.S., Wellington.
 * Waugh, G. N., M.R.C.V.S., Invercargill.
 * Wood, R. B., M.R.C.V.S., Auckland.
 * Young, A. R., M.R.C.V.S., Wellington.
 * Kyle, H. S. S., G.M.V.C. (Melbourne), Christchurch.
 * Marsack, H. L., V.S. (Ontario), Auckland.
 Ring, W. C., V.M.D. (Penn., U.S.A.), Ellerslie.

* Members of the Live Stock and Meat Division, Department of Agriculture, Industries, and Commerce.

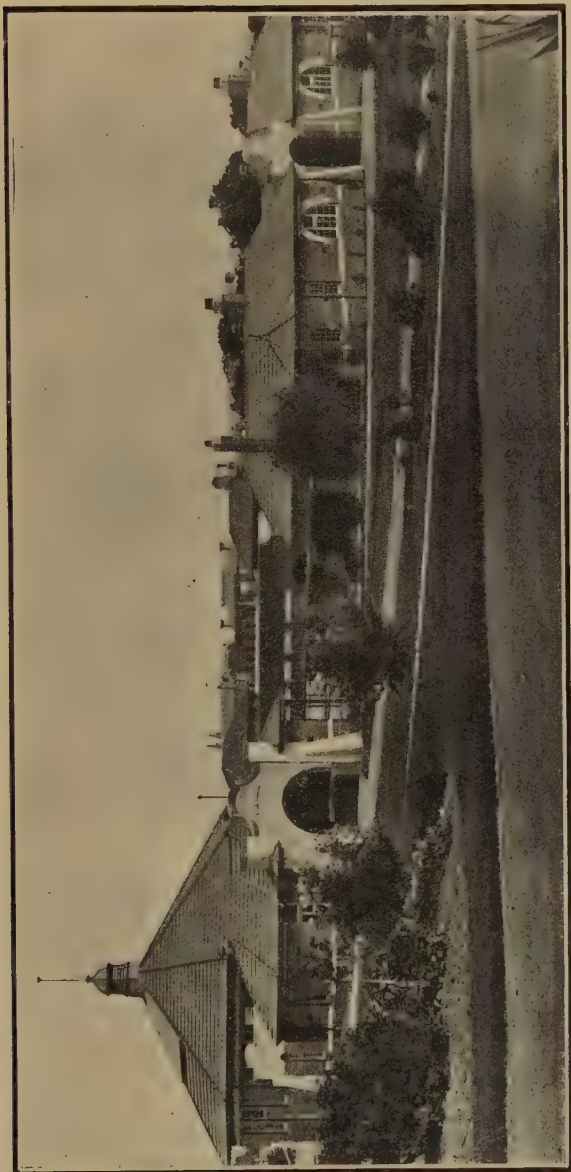
Casein.—The business of casein-manufacture is claiming increased attention in this country. The Midhirst Co-operative Dairy Company has installed—under the supervision of Mr. J. Pedersen, who investigated casein-manufacture in Europe for the Department—a thoroughly up-to-date precipitating plant, while the Bunnythorpe Co-operative Dairying Company has established several precipitating-stations. A number of North Taranaki dairy companies have now under consideration the question of initiating the business on an extensive co-operative scale. Individual dairy companies in other parts of the Dominion are also making full inquiries into the subject. The companies which have lately taken up the business are having the green curd dried and packed at the recently erected drying-factory of the New Zealand Casein Company at Aramoho. The quality of the casein being manufactured is of a highly satisfactory character, and should have the effect of establishing a good name for the New Zealand product from the very outset of the industry. The casein is officially graded prior to export, and each package is then provided with a special Government seal indicative of its quality.

There are 226 South Island farmers co-operating with the Department in the conduct of field experiments this season. Altogether 3,739 experiments will be conducted on southern farms.

From the 12th May to the 31st December of last year 315 letters from farmers were received at the Ruakura Farm of Instruction, asking for information in regard to lucerne.



MELBOURNE UNIVERSITY VETERINARY SCHOOL—ANATOMICAL AND PATHOLOGICAL DEPARTMENTS.



MELBOURNE UNIVERSITY VETERINARY SCHOOL—OPERATING THEATRE AND HOSPITAL.

THE HEMP INDUSTRY.

W. H. FERRIS.

IMPROVED QUALITY.

THE quality of the hemp graded last month was a decided improvement on that of the previous month. Not only was the strength of the fibre better, but the colour was greatly improved. This is in great part due to the milling of better leaf and to the improved weather-conditions for bleaching. The work of milling is being maintained at a good standard, both the stripping and scutching exhibiting careful manipulation, though here and there poor work has been in evidence. Some millers, it is stated, have not been able to turn out the quality of fibre they desired, owing to the difficulty of securing competent labour, due no doubt to the unusual extension in operations this season and the consequent necessity to employ untrained men.

STRIPPER-SLIPS AND TOW.

The preparation of stripper-slips for export is showing a remarkable increase. The necessity of preventing flax-refuse polluting streams is largely responsible for the development taking place. This has forced millers to adopt proper means of saving the residual material. A system coming rapidly into vogue is the use of an automatic elevator, to lift the waste from the drains, in order to wash it expeditiously and with as little labour as possible.

Now that stripper-slips are being graded, no doubt the quality will be improved, and thus probably make the slips more valuable to the manufacturer abroad. Little or no profit is made out of this commodity at present, except in the case of mills which have a large output.

The quality of the tow coming forward is distinctly unsatisfactory. In only a few cases is it as clean as it should be. Failure to free this by-product from dust and rubbish is the dominant weakness. This is to be regretted, as the use of tow is extending among manufacturers, and deterioration in quality will naturally check this tendency. The effect of this may not be immediately apparent, however, as the demand at present is treading on the heels of the supply.

TO MAKE GRADING UNIFORM.

The graders at the different ports are being temporarily transferred. This will enable each man to come into close touch with the work of the other officials, and, by thus encouraging the conception of a common standard, maintain that uniformity in the work of official classification of hemp which is so much to be desired.

THE APIARY.

NOTES FOR MARCH.

F. A. JACOBSEN.

The words "live and learn" apply more forcibly to bee-culture than to perhaps anything else. Lessons can always be learnt each successive season by the observant man, and thus may be avoided those little mistakes which are a drain upon profits, while an efficient system of bee-management will be thereby evolved. Not the least important lesson to be taken from this season's experience is the necessity of providing stores in view of a possible unfavourable season. Many beekeepers will be now convinced that it is a wise and assuredly a safe policy to make ample provision against possible starvation. Losses have been suffered in this way not once but many times, thus condemning the weak system of leaving but a minimum amount of stores in the hives instead of the maximum. Half-starved colonies will never winter well, but will exhibit weakness in the spring, and will then demand special feeding to stimulate brood-rearing. On the other hand, by leaving a few extra pounds of honey in a hive the strength of the colony is assured at the critical period, providing, of course, it went into winter quarters with a good population of bees. Weak stocks for honey-producing are practically useless. From 20 lb. to 30 lb. of sealed stores is necessary to be left in the hive for winter consumption by the bees, certainly not less than the former amount.

WEAK STOCKS.

At the close of the honey season, and when extracting is finished, all weak stocks should be united, and if any be found very weak three should be put together, or the weakest united with a fairly strong colony. This may be done by putting one hive on top of the other with a sheet of newspaper between, when in the course of a few days the bees will have eaten through this and mingled with one another without any fighting. It is preferable to kill the worst queen before uniting, otherwise there would ensue a battle royal, and the most useful queen may be killed or injured.

SMALL ENTRANCES.

The latest bottom boards to a hive have both a large and a small entrance. The large one is for summer use and is $\frac{7}{8}$ in. in height, and

runs the full width of the hive. By reversing the bottom board the smaller size is produced, which is only $\frac{3}{8}$ in. high, but which also runs the full width of the hive. This entrance is in most cases too large, and should be reduced by tacking on to it a strip of perforated zinc the whole width of the front, this being provided with two or three holes, each just large enough for one bee to pass through at a time. This assists in preventing robbing, and at the same time keeps out mice that would otherwise enter the hives and build their nests there. This precaution is most necessary where mice are numerous and when the beekeeper does not want his hive-mats chewed to pieces.

WINTER QUARTERS.

In very cold countries, such as Canada, the apiarist has to provide a substantial protection from snow-drifts and cold winds. A long



TARANAKI OUT APIARY ON CLOVER AND THISTLE DOWNS.

house fitted up with ventilators and bee-flights is generally used for this purpose, although not always. The hives are carried into this and remain there until the snows melt. Others use double-walled hives with straw packing or shavings between the two walls, or they have large cases that fit over two or three hives at a time.

I have used double-walled hives for wintering purposes in New Zealand, but find that the expense is quite unwarranted, as anything of the kind is unnecessary in this country.

WINTER TREATMENT.

The practice of feeding sugar syrup to bees in the spring to stimulate brood-rearing is not done nearly so much as formerly, but preference is given to the system of leaving in the autumn enough bulk stores to last the colony right through to the honey-flow. The reason of spring stimulative feeding was to make the colony rear early a large force of young bees to gather the harvest, but just when the flow was to be expected was a difficult matter of determination. Consequently when this was done too early more harm than good resulted from overstimulation: more eggs were laid than the bees could look after and keep warm, while robbing was encouraged. One of the main drawbacks is that swarming may be brought on prematurely. The system of leaving enough stores in the autumn to last right through, or of feeding in the spring, depends somewhat on the beekeeper and his locality. Many can doubtless practise spring feeding to advantage, especially



SOME OF THE HIVES BEING USED IN THE FOUL-BROOD EXPERIMENTS.

when dividing is intended for increase; but as a rule the best plan is to leave about 25 lb. of sealed stores to last the bees until they can gather more supplies for themselves. This method is especially recommended to beginners.

FOUL-BROOD EXPERIMENT.

The four Apiary Instructors are at present experimenting with foundation manufactured from foul-broody combs, with the object of discovering if it is possible to transmit "bacillus larvæ" by means of comb foundation, and so set at rest numerous doubts on this point. The experiment is an important one, and may affect the apiarist who models his own wax to suit his requirements. The system of using steam in comb-foundation making is not adopted to any extent in this country, and on this account the experiments in question will be doubly valuable. They will prove whether foundation manufactured from foul-broody combs with the least possible amount of heat will transmit the disease to healthy colonies. The results of the experiments will be published in due course.

POLLEN.

L. BOWMAN.

ALL observing beekeepers who take a pride and interest in their apiaries have seen the busy little toilers coming home laden with small pellets of a paste-like substance attached to their legs. This substance botanists call pollen. The question arises, where do bees get pollen? The keen beekeeper's attention is arrested by a bee working, say, on a dandelion. She is very busy, and is practically covered all over with a bright-yellow dust. For a moment she stops delving into the heart of the flower to clean herself, and as we stand almost breathless, afraid to disturb her, watching every movement, we see she is packing the pollen into little baskets called the corbicula, which nature has provided for the purpose.

Having ascertained that pollen comes from flowers, we pull a bloom to investigate it a little more minutely. In doing this some of the pollen settles on one's fingers. By the use of a small magnifying-glass we discover that the flower is composed of a number of smaller flowers, called florets, so arranged as to make a complete and beautiful whole. Turning our attention to an individual floret we notice again it is composed of more parts, each having a function to perform. The anthers, being the male portion, contain small pouches or sacs which, when matured and ripe, burst open, shedding pollen-grains, or the fertilizing dust. As the bee works from flower to flower, conveying pollen on the fine hairs of her body, she comes in contact with the pistil, or female organ, the end of which will be found to be sticky, the pollen-grains being held there by this substance. The tiny grains begin to grow down the tube of the pistil until they reach the micropyle of the ovum, there shedding the favilla. As soon as this takes place inoculation is completed. Flowers then begin to drop their petals, and the plant devotes its energies to the development of fruit in the shape of seeds.

The microscope is again brought into use for the purpose of examining the pollen-grains further, and for ordinary observation purposes we generally use a $1/6$ lens. Having made a collection of pollen from several different flowers and mounted them, we find, on looking at them through the microscope, that they are truly wonderful, varying in size, shape, and colour.

So far we have regarded pollen from a botanical point, but the question arises, what use do our bees put it to? In order to answer this we proceed to the hive. On close observation we notice, even with the naked eye, that pollen varies very much in colour. Here we see a worker bee just alighting on the board at the entrance of the hive, carrying pellets of bright yellow. Just a little further on we see another with blue pellets, and close at hand one with cream pellets, next to her another with orange, brown, green, and so on.

Amongst many of the earlier beekeepers who were not so well acquainted with matters concerning the hive this pollen was supposed to be material which bees gathered to make wax for comb-building. In those days, when skeps, boxes, and suchlike receptacles were used as a domicile for bees, there was really little hope of finding out what bees really did with the pollen, such hives being a veritable closed book. With, however, the vast improvements made in the methods of keeping bees, in properly constructed hives with movable frames, the closed book has been unsealed, thus affording a wonderful amount of food for thought.

As we withdraw a frame from the modern hive we admire the beauty and regularity of those fragile and marvellously constructed six-sided cells. On closer observation we see larvæ in all stages of development, and find that the pollen which the bees have brought in from the fields has been deposited in quite a large number of the cells, stored for future use, and kept moist by the addition of a little honey. When in this condition it is often spoken of by many beekeepers as bee-bread. Pollen is a nitrogenous food used by the adult bees, as well as the nurses, who use large quantities to rear larvæ.

It is a well-established fact that a dearth of pollen-bearing flora in spring retards brood-rearing considerably. Whenever this is noticed the wideawake beekeeper usually supplies this want by placing pea-meal flour or rye-meal in small boxes in a sheltered, sunny place.

Pollen which has been damaged by early frosts often proves injurious to bees, disarranging the digestive system and often terminating with dysentery. Pollen-grains in honey will give it a cloudy appearance. Pollen in honey is also liable to cause fermentation.

Pollen-grains, infinitesimal though they seem, are the mighty atoms that the world is dependent upon, and without their aid no creature could exist.

ORCHARD WORK FOR MARCH.

W. A. BOUCHER.

THE majority of fruitgrowers rightly consider that clean cultivation of orchard lands during the spring and summer months is desirable. Yet if this system is continued for a number of years the result in time will be a deficiency in humus. This will bring about a soil-condition which is more or less injurious to the trees, and tends to increase the difficulty of maintaining satisfactory cultivation. Especially is this so in the case of clay soils which, as the humus disappears, will have an increased tendency to run together after heavy rainfall, and to dry out again rapidly under the influence of sun and wind. Therefore it becomes essential that the humus should be periodically renewed. This is most satisfactorily accomplished by sowing a clover crop to be ploughed in in spring or early summer.

For preference, clover, rape, or mustard should be selected, as the orchard trees will then benefit considerably, not only by the humus, but also by the nitrogen which such crops will renew in the soil. In order to secure the best results, whatever crop is selected should be planted early while the soil is warm, so that good growth may be made before cold weather sets in. If the sowing is deferred until late, little more than the germination of the seed will take place, and the crop will remain in a stagnant condition during the winter months, permitting probably an undesirable growth of weeds. Under such circumstances the clover crop will have made poor headway when the time arrives in the spring for it to be ploughed under. In that case but little will be gained either in humus or nitrogen, probably not sufficient to compensate for the cost of seed and labour.

INSECT PESTS AND FUNGUS DISEASES.

As a general rule, insect pests and fungus diseases require less attention during the month of March than at any other period during the year. Still, there are two troubles that it will always pay the grower to keep under observation.

Codlin-moth.

This pest is usually most troublesome during the early part of the season, but it depends entirely upon locality and weather-conditions

whether late infection may take place or not. Therefore it would be as well for growers, especially in the warmer districts of the Dominion, to keep a good lookout for the eggs or newly hatched grubs of this pest, and, if necessary, to take measures to protect their crops of late apples or pears from infection.

Leech.

This pest, if the necessary steps have not been taken to keep it under control, will continue to do serious injury to foliage until quite late in the season. The result will be that buds which should be plump and vigorous will show imperfect development, from which affected trees will suffer during the following season. Spraying with arsenate of lead should be continued until no further signs of the pest can be noticed.

GRADING AND PACKING.

The necessity for the careful grading and packing of fruit cannot be too strongly impressed upon growers. Although there has been great improvement in this respect of late years, and many growers realize the value of carefully selecting, grading, and packing their fruit, still it is even now no uncommon thing to come across consignments badly graded and packed, and more or less infected with pests and diseases of various kinds.

This is much to be regretted, as the returns to the consignors can never be satisfactory, while the marketing of inferior qualities must to a greater or less extent affect the selling-value of the better class of fruit.

As an explanation for the rapid extension of the trade to Germany, Government fruit experts state that the market facilities at Hamburg are much superior to London. In the German centre every case is opened for inspection, but at Covent Garden only one case of a line of apples is opened, and as a result deception is easily possible.—*Australasian*.

The spirit of co-operation is spreading among Nelson fruitgrowers. On the Motueka side of the Moutere Hills many of the growers have combined to form what is known as "The Moutere Fruitgrowers, Limited," whilst at Stoke, on the Nelson side of the hills, has been formed "The Stoke Fruit Distributing Company." It is gratifying to know that these properly registered trading companies have as one of their main objectives the bringing of the grower and the consumer into closer touch.

GRAPE - CULTURE.

S. F. ANDERSON.

WORK IN THE COOL VINE-HOUSE FOR MARCH.

ONLY the very late grapes will now be left in the houses. As these are disposed of keep the houses as open as possible, to enable the wood to thoroughly mature. So long as the weather keeps warm there is danger of red spider and thrip attacking the green shoots and leaves.

Where it is intended to plant vines in the coming winter the borders of the new vinery should be prepared by trenching, so that the soil may be well aerated and weathered before planting-time.

The vine-borders of old vine-houses are much benefited by a thorough renovation. This work, however, should not be started till May. The borders can then be trenched over, carefully lifting, pruning where necessary, and relaying the roots; adding fresh soil—well-rotted manure and a dressing of bonedust, about 8 lb. to 30½ square yards. This renovation of old borders when once started should be promptly carried through, and only done in dry weather. On the other hand, should the soil be very dry the roots may require to be settled in their place by a liberal watering. No check to the vines need be feared where the work is properly and promptly carried out, but a great benefit will be manifest the next fruiting season.

WORK IN THE VINEYARD.

Beyond keeping the vineyard clean no particular work will be required during this month. In the case of outdoor Black Hamburgh vines, should the weather be showery after they begin to colour and the foliage be heavy, a few of the lower leaves of the fruit-bearing shoots may be removed, not for the purpose of permitting the sun to get at them, but to allow the wind to dry up the moisture quickly. These lower leaves have performed their functions for the season, and no harm can come from their being taken away. This applies to vines being grown on the double Guyot method on espalier fences.

The chief trouble at this time is the birds. This applies to the outdoor-grown table-grapes, Black Hamburgh and others. Where the area is not large and the market for them good, it is best to cover them in with the small-meshed wire netting. This is done by stretching an ordinary fencing-wire along the surface of the ground 15 in. from the espalier fence on each side, and fastening it firmly to pegs put in

about every 10 ft. Use the 3-ft.-wide netting. One edge of this is fastened to the wire along the ground on each side of the vine-fence and the other two edges brought up against the vines, forming a sort of tent. The ends, and where the top edges of the netting come against vines, must be securely closed, otherwise the birds will get in. The first cost of this is heavy, but, handling the netting with care, it is almost everlasting, as it can be rolled up and put away after use each season.

IN THE CELLAR.

Where winemaking is carried on, if not already done, all cellar machinery must be carefully overhauled and seen to be in perfect working-order. The walls of fermenting-house should be whitewashed with newly slacked lime. If the floor is of earth, this should be swept to a hard surface and then well dusted with freshly slacked lime. All woodwork, such as vat and cask stands and benches, should be scrubbed clean. While this work is going on, which requires a general shifting of things, the hoops of vats and casks can be driven on and their thorough cleaning attended to.

MAKING SMALL QUANTITIES OF WINE.

S. F. ANDERSON.

IF the quantity of grapes to be dealt with is not large—say, up to 500 lb.—the appliances for making the wine are very simple. Every 16 lb. to 17 lb. of grapes yields a gallon of juice or, as it is generally called, “must.” Therefore 500 lb. of grapes will make from 30 to 35 gallons of wine.

To ferment this quantity an ordinary wine or spirit hogshead with the head taken out and stood on end will serve very well. Its capacity should be 60 gallons, as the cap of skins and the rising by fermentation takes up a much greater space than that required for the must. The hogshead should be placed on a stand of some kind to allow of a bucket being put under the tap in the bottom of the hogshead.

It is most likely the grapes will not contain more than 19 per cent. of saccharine, so that to make a good-keeping dry (not sweet) wine it will be necessary to add 1 lb. of the best sugar to every gallon of the must. When fermentation takes place this sugar, together with the saccharine contained in the grape, naturally is converted into alcohol, which keeps the wine.

If you desire a sweet wine the sugar must be increased to 3 lb. to the gallon.

Utensils required.—One freshly emptied spirit or wine hogshead, 60 gallons; one freshly emptied spirit quarter-cask, about 35 gallons; one half-inch wire sieve; one wooden bucket or large enamel jug for dipping and carrying; one good-sized tap (1 in.) put in bottom of hogshead to draw off the wine when fermentation is completed.

To make the Wine.—See that the grapes are perfectly ripe; if inclining to shrivel, so much the better. The success of wine depends on the perfect ripeness and condition of the grapes. Place a couple of battens across the top of the open hogshead to rest the sieve on. Then rub the grapes through the sieve, leaving the stems behind. The object of passing them through the sieve is to break the grape and keep back the stems. When all the grapes have been rubbed through add the sugar.

Fermentation starts immediately unless the weather is very cold. As soon as fermentation sets in strong you will find the grape-skins floating on the top like a cap. This cap must be frequently broken up and pushed down. The top of the hogshead should be kept covered with a piece of close calico and a loose hoop to drop over and keep it in its place.

Adding sugar to the must prolongs the fermentation considerably, so that this may go on for some weeks. When it has ceased the wine should be drawn off by tap at the bottom of the hogshead and put into the fresh whisky quarter-cask and filled to the top or bung-hole, but not bunged up until all fermentation has ceased. A small bag of sand is a good thing to put over the bung-hole, as it permits the carbonic-acid gas to escape and prevents the air getting to the wine.

The wine is now made, and only wants racking off, when thoroughly settled and clear, into another cask of the same size. It should be kept for two or more years before using. In the meantime the cask must be kept full. Any air-space may cause some defects in the wine. When it is considered sufficiently matured it should be bottled right off.

The following hints should be observed: Do not let the must or the wine come in contact with iron any more than can be helped. The rubbing of the grapes through the sieve must be completed in one day. If the grapes are weighed as picked it will be easy to calculate the number of gallons that can be expected. All utensils must be very clean. The casks, if freshly emptied of spirit, need not be further cleansed. The wine should be kept in a cool place and not subjected to great changes of temperature. A bunch of dry twigs (dead tea-tree serves very well) tied over the tap inside the cask will assist to prevent the tap choking up with the lees. Some means will be required to press the skins. A false perforated bottom to the hogshead which would permit the wine to go through is the best I can suggest. The skins could then be tramped upon after the wine has been drawn off.

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

Peas.—It is important for the grower for home use to make a wise selection of varieties. In this respect the properties desired are different to those sought by the grower for market. The latter grows large breadths, and ease of gathering is a very important item. For this reason he uses varieties that ripen almost simultaneously—that is to say, the entire crop is fit for pulling in one or two operations. The gatherer is thus saved the time that would be involved in selecting pods if the crop matured by degrees. The necessity for quick gathering is proved by the number of half-filled pods frequently found in market lots, the result partly of the necessity for quick work, and partly of inexperienced gatherers not being able to detect the filled pods quickly enough. In the home garden, however, quickness in gathering is of less importance, and, an almost daily supply being required, it is necessary to select for growing varieties that mature by degrees. But there are also considerations of quality, and what one may term sentimentality. Something very handsome either in the garden or on the table may give satisfaction to the grower or user, though falling short of others in quantity produced. Others, again, may only consider utility, with a fair standard of quality. The following observations may be of value for future guidance. There are three varieties that may be termed “second earlies” now on the market—viz., English Wonder, Daybreak, and Carter’s Springtide. There is very little difference between these, the balance being in favour of Springtide, the joints being closer together and the peas slightly larger. They come at the same time if sown together, and last as long, the weight produced being rather in favour of Springtide. This pea, sown on the 2nd August, came into use on the 30th November, and gave a good supply till the 4th January, or about five weeks. Sherwood, sown on the 2nd August, was first gathered on the 14th December, and lasted till the 4th January, or three weeks. Sutton’s Dwarf Defiance, sown on the 23rd August, was first gathered on the 23rd December, and lasted on till the 4th, or less than two weeks. This is a very fine table variety. These notes surely prove that for utility Springtide is most valuable. The flavour is very good, though not of the highest grade. It is well known that early crops of peas are the best, but the later behaviour of a variety may be

different. To test this point I have the same variety sown later now coming on, and hope to report on the experiment later. At present it appears that for utility purposes this and similar varieties are of the greatest value. First-early varieties, by which is meant varieties that take the shortest time to come into use, have not been tried in proper sequence this season. The reason for this it is not necessary to relate, and I will not go back to other years. A comparison, however, is afforded by the pea Richard Seddon, sown on the 14th August and gathered on the 14th December, lasting till the 30th December. Note that this took as long as Springtide to mature, and lasted half the time, or less. A promising first-early—Impudence—is being grown for seed. Four seeds were sent me last year, and seed from these is now maturing. A further crop, sown on the 10th October, was ready for use on the 23rd December. Further observations will be reported on in future issues.

When these notes appear all provision for winter should be made or arranged for except in a few cases.

Turnip-seed may still be sown in small quantity. It is too early yet to sow for winter use.

Leeks may be planted up to the middle of March, but it should be understood that only those planted before this time will attain a large size. Good size is very essential in leeks. Few plants make so many roots or take so much out of the soil as these do. The method of planting has been described before, but will bear repeating, as there are still many who adhere to the old wasteful way of planting in trenches. The plot should be first marked out in lines 15 in. apart. Then hoe a deep drill along each mark, as though intended for beans or peas. Now take a dibber and make a hole its full depth. Put in a plant as far as it will reach; now lift it a few inches to bring the roots, which will be doubled up by insertion in the hole, into a proper position; thrust the dibber into the soil about 3 in. from the hole, and lever the handle over toward the plant. This will fill the hole full of soil and at the same time make it firm about the plant. The plants require to be large, so that at least 8 in. will be below the surface. Needless to say, the soil should be deep and well worked, otherwise the leeks could not be planted, nor would it be fit to grow them.

Endive may be sown now for winter use in the same way as lettuce.

Silver-beet should be sown at once. Sow in drills 15 in. apart, and thin to 12 in. in the rows. The best varieties I have grown are Lucullus and Sutton's seakale beet. The soil should be deep and rich.

Sow *spinach* before the end of this month, remembering that growth will be made during winter. Choose a well-drained plot, and, if it can be managed, let it be a plot that was well manured for a previous crop rather than dig in strong manure now, as this would tend to make the soil cold in winter by holding water. The soil will be fairly rich—if it has been well manured recently, so as to ensure sufficient humus—and a dressing of bonemeal will be sufficient now. The plants should be thinned to 9 in. or 10 in. apart at an early stage.

Tomato-plants require constant attention in respect to keeping away waste growth and tying to their supports. In the matter of tying there is a right and a wrong way to do it. The wrong way leads frequently to chafing against stakes, or cutting through the stem; the right way prevents both evils. The raphia may be passed first round the stake or wire, or round the stem of the plant: sometimes one way comes handiest, sometimes the other. Supposing it goes first round the stake, you put the strand round the back of the stake—that is, the side farthest from yourself and the plant or stem to be tied, the two ends being towards you; cross these, transferring the end in your left hand to your right, and *vice versa*; now bring the two ends round the stem and tie at the back—that is to say, the outer side. It will be found that the tying-material now forms a figure 8; the strands cross between stake and plant, which are thus kept apart. Moreover, there is some room for play under the influence of wind—a great safeguard. The plants are then much more secure from damage than if tied tight and immovable. This is the proper tie for all kinds of plants, and is particularly useful for securing such brittle subjects as *chrysanthemums*.

Winter Rhubarb.—In the last issue the sowing of seed of winter rhubarb was advised. If seed was put in it should now be up and making plants. Thin out so that no two plants stand together, and leave a space of 12 in. between the plants. This space will not allow for full development, but is sufficient at first. The first lot of stalks should be available for use in about twelve weeks from sowing. That is my experience. After a few weeks the plants will want more room. Each other one may be then either lifted and planted elsewhere or cut out and destroyed. In the meantime they will have given some stalks for use. This class of rhubarb may be regarded as of very special value in a country garden, as it supplies fruit for pies or stewing all the year round. The term “winter” is somewhat of a misnomer; it would be more properly described if called “All-the-year-round” or “Evergreen.” It is quite distinct from the ordinary type, which is dormant in winter. No systematic experiments have to my knowledge yet been made in its cultivation, but it is easily seen that the proper

system will be—seed-saving from selected plants, to work up a good strain, and renewal every few years by seedlings rather than by dividing plants. There is a wide field for selection, as plants differ greatly in size of stalk and colour. It is very little use attempting to grow rhubarb of any sort in any but rich ground. It seems impossible to feed it too much. A soil very rich in humus is an absolute necessity to complete success. Stable or farmyard manure is the best of all, because it supplies humus as well as other requirements. Humus provides a good working medium for the roots, and retains moisture in summer. Here, being unable to obtain that form of manure, leaves cut off are returned to the soil as far as possible, and sheep-droppings are collected, soaked in a tub of water, and then poured on between the plants—a tiresome process where water has to be carried some distance, but it must be done or failure will result. Bonemeal is given in winter.

Waste vegetable matter of various kinds, always inseparable from vegetable gardening, such as cabbage-leaves, tops cut from turnips when bunched up—in fact, all such stuff—has a value in the economy of the garden if properly used. It is a good plan to have a plot of ground from which a crop has been cleared dug by degrees and all such stuff dug into it. It returns a certain amount of humus, lacking which soil becomes unworkable and infertile. This waste material if left on the surface withers away in a useless manner. Perishable weeds should be also dug in. Weeds with perennial roots like couch and sorrel, and other garden refuse, such as soft hedge-clippings, should be put in a heap and occasionally sprinkled with lime to destroy fungus spores. This makes in time good vegetable mould valuable for digging in.

SMALL FRUIT.

There are many inquirers about the cultivation of *Cape gooseberries*. This is a fruit that undoubtedly deserves more extensive cultivation. It is an excellent pie fruit, second to none as a preserve, and bottles well. The plant is a biennial—that is to say, it lives two years; but, unlike most biennial plants, it flowers and fruits twice if the plants are raised at the proper time. The time to sow the seed is from mid March to early April. The plant is injured by frost, therefore it requires shelter of some kind. If the seed is sown in a box the seedlings should be pricked off into other boxes, and kept in these till danger of spring frosts is passed. It is important to secure strong plants for putting out, so that considerable-sized bushes are obtained by early autumn after planting; otherwise they are late coming into fruit, and bear but few fruit the first season. For that reason plants raised in spring are of little value. The manner of planting may differ according to circumstances. Some plant against a fence and tie the plants roughly

to it. They are as well, or better, served by planting in an open space. Put three plants in a triangle, each plant 6 in. or 8 in. apart, and the clumps 5 ft. apart. The purpose of planting three plants in a clump is that by interlacing with each other they will afford mutual support against wind. Fruiting commences about March, and continues throughout the winter unless stopped by frost. If frosts are experienced the tops will be killed. Leave these alone. By no means cut them off, or the entire plant may be killed. Early in summer, or late in spring perhaps, new shoots will spring from the bottom. Now cut away the dead tops. The following autumn should see the best crop of fruit, for it begins to ripen earlier, and so has a longer season. After that the plants die.

Strawberries.—There are a number of ways of growing these plants. The market grower looks for the largest quantity of fairly good fruit with a minimum of labour, and frequently adopts what is known as the matted-row system, or some variation of it. For home use fine fruit is the first consideration, the amount of labour required for a small patch not being considerable. Single rows with plants well apart is the plan that is the best for the purpose. At the present time much treading may have made the ground hard. If so, break it up, not by breaking it up deeply, but by surface cultivation. At the same time remove surplus runners—that is, all that are not required for planting. It appears that the almost universal custom with market growers is not to allow the plants to bear the first season after planting. This plan would scarcely satisfy the owner of a private garden, nor is it necessary or the best plan. Probably the grower of acres is unable to give proper attention to securing good runners in sufficient quantity. So he has to devote the first year to growing his plants. My own aim when growing strawberries was to get my best fruit the first season, and plenty of it; and I was not disappointed. The way to proceed is to cause the earliest runners to root, and not allow them to extend further. This has been advised in former numbers of the *Journal*. As soon after this issue as the ground gets moist with rain, and the waning days secure cooler conditions, these runners should be lifted and planted in a nurse bed of good soil. Plant in rows, leaving room for a hoe between, and 6 in. apart in the rows. Ground for a new bed should be got ready early in autumn. Work in a good lot of rich stable manure. Dig the ground well, but do not break the surface soil up too fine. The surface now thrown up should be the surface for planting on. The soil should not again be deeply dug, though it may be advisable to point it over. The object in view is to get the soil well aerated, and allow weed-seeds to grow so that they may be destroyed. This supplies the reason for not changing the surface, as new soil turned up would bring weed-seeds with it. My own practice

favours spring planting. Autumn planting, in my opinion, should never be adopted except in the case of light soil. I always found it best to keep the surface moving until spring. Then there was no danger of the soil souring about the plants. The plants were put out in August in rows 2 ft. apart, and 15 in. from plant to plant. The plants were lifted with a fork, each with a good ball of earth.

Raspberries.—Those who can manage to give a good dressing of stable manure at this time will be wise in doing so. Perfecting the canes is of more importance than anything, and a dressing of fertilizer can be given in winter. Keep the alleys free of weeds and suckers.

Gooseberries.—These also will benefit by a dressing of manure. Where spraying for leaf-spot has been neglected it would be wise to do it even now, though harm may have already resulted from the neglect. Our own bushes were sprayed as soon as the fruit was off. The result is perfectly sound foliage throughout, though some of the bushes were slightly affected before spraying.

FLOWER-CULTURE.

Carnations that were layered as advised will shortly require attention. Rooting is usually accomplished in five or six weeks, sometimes less. They should be well rooted before being taken off. A little careful examination will show if they are rooted. If they are, they may be at once removed from the plant. Some think—I did myself—that it is best to cut through the connecting-link with the plant, and then leave the layers for a few days before taking them up; but I do not think there is any necessity for it, or advantage. There is no difference of opinion among carnation-fanciers about the best time for planting. All agree that it is well to keep the plants in a nurse bed till spring. August is the time to put them out into their permanent quarters. The reason is the same as given for planting strawberries in spring: it affords opportunities for working the soil up to the last moment, thus securing a well-sweetened soil free from weeds.

Planting *bulbs* should receive attention. All those that flower in spring may be planted now. *Narcissi* should be planted as soon as possible. The following are spring-flowering species: *Gladioli* of the *Colvillei* family. The following are the best: *Albus* (the Bride)—the original Bride is white with carmine marks in the centre; this is the best of all the family, and is still extant, but is known by doubtful names, most commonly *Pink Bride*, *Cupid*, *Insignis*, *Favourite*, *Ramosus*. *Ixias*: these are all good. The variety *longiflora* deserves special mention because it is different to any of the others, and I think it is a pity it is not accredited with its old name—*Morphisia paniculata*. This is a flower certain to please, being very suitable for table-decoration. *Babiana*, *Tritonia*, *Lachenalia*, *Scilla*—wood-hyacinth: the white and flesh-coloured

varieties are best. *Brodiaea coccinea* is a very attractive little flower not often grown as it should be. *Chionodoxa* has beautiful blue flowers. *Chlidanthus fragrans* has very handsome yellow flowers of good size. A variety is catalogued as *Fragrans major*. This is wrong and very misleading. It is a totally distinct plant of different habit. It is *Hemrocallis major*, and, though a good thing, is inclined to be rather aggressive owing to its strong stooling habit. It is well worth having where there is plenty of room. Once planted it will look after itself. The crocus, hyacinth, and tulip are so well known as to require nothing beyond a reminder to plant now, though a hint about pot culture may be acceptable. The difficulty frequently experienced is to get the flower-head to throw up boldly. The reason is that top growth is always inclined to get ahead of root-development, resulting in stunted heads. When the bulbs are planted in the open ground this difficulty is not met, but in pots the crown of the bulb is of necessity too near the light. The proper thing to do after potting is to lay the pots on their side with the bottom ends against a wall. Then cover them up with a heap of coal-ashes or sand. Coal-ashes are best. Leave them for about six weeks. Then examine and bring out to light any that are pushing out growth. *Lachenalia tricolor* and *Nelsoni* are bright, easily cultivated plants. *Milla* or *Tritelia uniflora* are showy little bulbs. Some object to them because of an oniony smell. *Ranunculus* are very beautiful, though not so uniformly successful as most bulbs. They will not do in a soil that alters its character under the changing influence of wet and dry. It must be permanently friable and non-binding. Then they will succeed. *Sparaxis* varieties are all worth while.

Preparations should be made for raising *biennials*. They may be sown at any time from now up to the beginning of April. Most of this class of plant will fail to flower next season unless the plants are raised in autumn. Others will flower, but at a much later period. *Antirrhinums* are of this nature. Sow them in autumn for early summer flowers, and in spring for autumn flowers. *Gypsophila paniculata*, a much-sought-for plant, will flower next season if sown in autumn. This plant should be grown on in small pots. It is very hard to establish if the roots are broken. Canterbury bells; East Lothian, Brompton, and Intermediate stocks; dianthus, columbines, gaillardias, *Coreopsis grandiflora*, and various other perennials, as well as biennials, should be also sown, such as sweet-williams, and carnations of all races.

The call for better farming means, first of all, right reasoning and a study of economic production; it means more and better farm equipment; fewer acres to the man, scientifically cultivated; greater variety of crops, heavier yields per acre, and more and better live-stock.

THE POULTRY INDUSTRY.

F. C. BROWN.

MARCH MATTERS.

THE inauguration of the winter-egg season is at hand—the time when the maximum returns are to be obtained by those who have bred and managed their pullets to the best advantage. Because guaranteed fresh eggs are worth big money in winter it is not to be supposed that all plants then carry profitable stock. The winter layer costs, on the whole, more to produce and maintain than a bird bred in its natural season, and unless the winter-egg pullets are all bred to the right time and brought to lay just when their eggs are needed most the production of winter eggs is seldom a really profitable undertaking. With pullets going into a moult just on the dear-egg season, and many not laying as strongly as they should, through absence of proper quarters or weakness in management, it would pay some poultrymen better to hatch a little later in the season—October and November, thus taking no risk of the pullets going into a premature moult—and depend more on eggs laid in the cheaper season, which, if the price be too low, can be held over in a preservative and sold at a good figure later on. It must be remembered that the very dear season is being more and more curtailed, and it therefore becomes increasingly imperative that the pullet intended for winter-egg production should be handled with the greatest care, so that she can be depended upon to lay just when required.

It is to be feared too many fail to attach due importance to the cost of production. If the early-hatched pullet is to pay her way, she must be encouraged to give every egg she can, provided, of course, she is not unduly forced in this connection. In the first place, she must be brought naturally to maturity, and must not be subjected to many changes in environment if her first laying season is to proceed without check. I have lately seen owners with pullets which should come to their laying season about March changing them from run to run, with the object of retarding their laying till the dear-egg season sets in. This is a good policy where the birds being bred are coming too rapidly to maturity and promise to commence their laying season before they are sufficiently well developed to enable them to lay a decent-sized egg and to last out a profitable season. Where, however, the birds are sufficiently matured—having been bred in July or August—and are ready

for a good laying season, they should not be interfered with in any way; though, of course, it is not necessary to force them at this stage by feeding a full meat ration. In any case they will probably go into a moult before winter, but, if they are of the heavy-laying type, the moult should only be a light one, and this will certainly not lead to lessened production in the dear season to the same extent as will any artificial postponement of the laying season.

The man who will be successful in having his birds laying just when he wants them to is he who really knows the strain he is working with. Some strains mature at, say, four and a half months old, while others will not mature till they are six months of age. Being acquainted with the average age at which his particular strain will mature enables the breeder to hatch at the right time and carefully bring his birds to lay just when they are in fit condition. Unfortunately, too many poultrymen have such a mixture of strains in their flocks that they have no means of knowing when to expect them to begin business. One of the curses of the poultry industry at the present time is the craze for early maturity and the mad striving after yield, regardless of the size of eggs laid. Modern utility-poultry breeders have good reason to congratulate themselves on the perfection of the laying-machine into which they have converted certain races of domestic poultry, but there is always a limit to man's interference with nature. We have a striking demonstration of this in the deterioration in the size of eggs resulting from phenomenal yield. It is only natural to expect the bird forced (by selection) to early maturity—built on fine, small lines—to lay small eggs; but we have birds which are of good desirable size and coming to full maturity before their laying season the eggs from which are most disappointing.

THE POULTRY GOLD-MINE.

A correspondent sends me a page advertisement from an American magazine which contains the statement that £300 has been made from sixty hens in ten months on a city lot 40 ft. square, and asks, "Could you advise me as to the value of this statement? It appears too much like a royal road to the poultry business."

I have repeatedly been called upon to disillusion many who have been misled by similar overdrawn statements into taking up poultry-keeping as a means of livelihood. The American boomster says nothing of the settings and birds he sold at fancy prices, which were almost entirely responsible for the return he advertises. I have insistently declared that poultry-keeping as a business is only successful under exceptional circumstances, the chief of which is that the man in charge has a combination of necessary characters found in few individuals. Experi-

ence, enthusiasm, business capacity, passion for detail, and a love of neatness and cleanliness, are qualities which must be possessed in greater or lesser degree; and combined with these there must be the necessary capital behind the venture, while the site of the plant must be suitable, and the location must be near a good market. The business of keeping poultry on a large and extensive scale is indeed so exacting that it cannot be expected it will succeed except with a small minority. Where the great bulk of the poultry are being kept to-day is where they will be kept in the future—on the farm, as a side line. Realizing this, it is the desire of the Department to raise the standard of farm poultry, to bring about a keener appreciation of the possibilities in poultry products on the part of the farmer as a mere adjunct to his general farming operations, not so much on the sheep-farm or cattle-run, but on the small farm where the successful production of the minor products bulks large in the year's revenue. Many a farmer's wife or daughter has paid for the groceries and has been provided with a little pocket-money from the poultry, even though these may be a nondescript collection and housed and managed in a rough-and-ready manner. Instead of having to feed the birds out near the stable or cow-shed and hunt along the hedges for the eggs, how much more pleasant it would be, and decidedly more profitable, were the birds kept in comfortable quarters and managed as they should be. Of course, range for young stock is always desirable, and a free run for the hens for an hour or two in the afternoon is an advantage. If poultry-keeping were studied by the girls on the farm, and only young and high-type layers of a general-purpose breed kept, and then only sufficient to be handled with advantage, what pleasurable and satisfactory work it could be made! Viewed as it should be, as a properly conducted side line on the small farm or the suburban holding, poultry-keeping becomes an important wealth-creating medium. At the present time there are probably more people producing eggs and poultry in the Dominion than are the people engaged in producing any other commodity. Hardly a farm is without its few fowls, while the majority of suburban and country residents have their little flocks. The individual production is small, but the aggregate is great; in fact, the total wealth produced by medium of the hen would be found to be greater than that of any of our smaller industries could an accurate census be obtained. It is safe to assume that the great majority of the people keeping poultry find it profitable to do so, especially in these days when so many facilities are afforded for the securing of really profitable layers. Indeed, the most gratifying feature of the industry at the present time is the improved character of farm poultry from an egg-producing point of view, while a desirable tendency is observable on the part of the farmer to keep general-purpose breeds of the laying type. What is

most to be desired now is an improvement in the methods of keeping birds on the farm, together with a more sane method of marketing. Poultry would then be a much more profitable side-line than it has ever been in the past.

Even with the improved standing of utility-poultry keeping in New Zealand of late years, some people ridicule the fact that poultry can be made really profitable stock. They are certainly right so far as the stock they fancy are concerned. To enthuse over Brahmas, Cochins, and Langshans, as well as the extreme fancy types of some other breeds, proves that they regard poultry mainly as a monstrosity for the exhibition of extraordinary form or the display of fine feathers. A well-known retired southern Langshan-fancier admitted to me the other day that his pullets did not commence to lay till they were twelve to thirteen months old. This was a result of continual checking of the laying-propensity in order to secure extreme size for the show-pen. Of course, such stock are unprofitable to any one but the fancier. The best argument that can be produced to prove the increasing popularity of poultry-keeping, now that the utility characters of poultry are being developed, is that according to the last census the number of birds in the Dominion increased by over half a million above the number returned at the previous census.

DISEASE.

When a bird is moulting she is just in the condition to contract disease, especially such a disease as tuberculosis. It is imperative, therefore, that the birds at this time should be in as good a condition of health as possible. Naturally they are not as robust as when they commenced to lay, but their blood should be in good order and their surroundings should be as sanitary as possible. A plentiful provision of green food, clean water, and grit are also important, while a plain nourishing diet should be supplied. If birds which it is desired to breed from (the highest-type layers of the flock) are found to be affected with tuberculosis—and it is often the case that the heaviest layer is the first bird to contract disease—no sentiment should be allowed to enter into the matter: they should be killed. Drastic methods of suppression are most necessary, and no time should be lost in thoroughly cleaning up the plant and removing all sources of infection, chief amongst which is the droppings of affected birds.

The most serious cases of tuberculosis I have come across have been where the birds have been housed in badly constructed and ill-ventilated quarters.

The symptoms of tuberculosis are many, but it is only the man of experience who can detect them. To the novice a wasted appearance

is perhaps the plainest sign. Then the breast-bone stands out sharply from the body, and the neck is devoid of flesh. The comb presents an unhealthy appearance. Diarrhœa accompanies the disease, and the excreta are of an unnatural colour. The bird generally limps in the right leg during the later stages of the disease. When opening up a tuberculous bird the liver is found to be greatly enlarged by reason of the presence of tubercle nodules scattered throughout the mass. Sometimes the terms "spotted liver" and "going light" have been used to designate the condition of a bird whose liver presents this appearance. It is, however, tuberculosis and nothing else. Of course, for this there is absolutely no cure.

THE LATE CHICKEN.

A mistake in brooding made by too many poultrymen is to entirely disregard climatic influences. They maintain the same conditions in the brooder in warm summer weather as in a cold period in early spring. On the other hand, there have been instances in my experience where the opposite mistake has been made, the breeder arguing that with warmer weather the chickens can do with less heat, with the result that in the early morning or during a sudden cold spell the chickens are insufficiently protected. Successful brooding demands constant observation and attention. While the heat should not be reduced except when there is no risk of a chill, so the heat should be reduced when it is naturally present.

Many losses in brooder chickens have taken place this season. In the majority of cases the mortality was due to the old trouble of overcrowding. Probably the greatest weakness in artificial brooding is allowing chickens to huddle, this being induced either by overcrowding, poor ventilation, excessive heat, or insufficient warmth. Huddling means sweating, and sweating is the great cause of brooder mortality. Its effect is manifested in several ways. The sweated condition, which generally induces chill, brings on a weakened state which is often manifested by bowel trouble and a general lowering of the vitality. Another effect of overcrowding too common this season is a weakened condition of the limbs, the visible signs of which are swellings in the joints, with a gangrenous condition supervening, the swelling first making its appearance in the hock-joint and then travelling to the wing. In a few days the neck and head swell, and then death is not far off. In all these cases arising from improper brooder-management nothing can be done for the chickens badly affected. Those in the early stages may be saved and the trouble prevented from attacking the sound chicks by providing the right conditions—the desired temperature (90° and less according to age) and giving ample space for the chickens to spread out while obtaining the necessary heat, together

with adequate ventilation. Good feeding is necessary for chickens, but it is not nearly such a vital consideration as provision of the desired brooding-temperature and proper ventilation. Be guided by the old hen.

GREEN FEED.

At this time of the year—indeed, at all times—an adequate provision of green feed for poultry is imperative. It not only keeps the birds in good health, but it replaces to a material extent more costly foods. There should be no lack of it on the farm except in dry spells, which should be provided against. Watercress is excellent. The best of all green feed, however, is lucerne, and there is no reason why the vast majority of those who keep poultry should not have this in continual supply. There are few soils in the Dominion where it cannot be grown. The chief requirement in establishing lucerne is a thoroughly clean seed-bed and applying lime to the soil. In the poultry section at Ruakura Farm of Instruction lucerne is thriving, and is providing all the green food necessary for the flocks.

THINGS TO BE REMEMBERED.

Do not waste the poultry manure. It is a highly valuable fertilizer.

Do not allow the males to run with the layers except in the breeding season.

All surplus cockerels four and a half months old and over should now have been marketed.

The table cockerel is only truly profitable when marketed before the second lot of feathers commence to develop.

A pinch of sulphur in the mash is beneficial when the fowls are moulting.

Do not adopt every new idea. Test it before applying it in general practice.

Overcrowding is one of the worst and most frequent mistakes made by poultrymen.

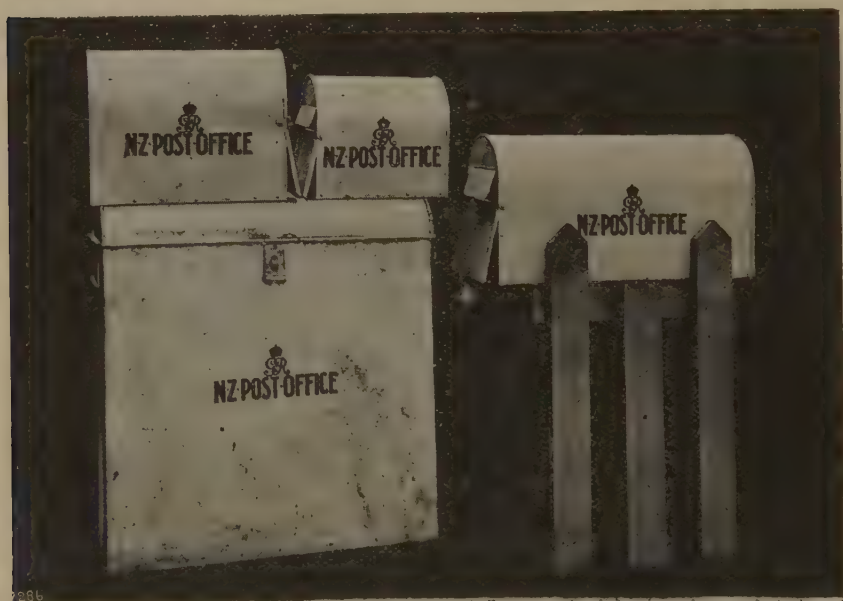
Good management, of which economy is an essential detail, is imperative to the best results.

Roup may be almost invariably traced to dampness or undue exposure to wet and cold weather, lice and want of cleanliness being contributing causes.

In laying out a plant the principal point to consider is economy in labour. Locate the buildings in such a way that the birds can be attended to and the buildings cleaned with as little loss of time as possible.

RURAL DAILY MAIL DELIVERY.

THE forward movement by the Post and Telegraph Department to provide the New Zealand farmer with a daily mail delivery is being fully appreciated. The first supply of 500 of the special Canadian boxes, secured for the purpose at a cost of 15s. each, was rapidly exhausted, and another 500 boxes, to arrive at the end of this month, are practically all disposed of. Cheaper locally made boxes are being furnished, and the demand for these is greater than the contractor can keep pace with. These simple galvanized-iron boxes are provided with no means, as are the Canadian boxes, to indicate whether there is mail-matter to



PRIVATE POSTAL BOXES FOR RURAL MAIL ROUTES.

collect or whether anything has been left by the mailman. A substitute has been devised by some farmers in the shape of a small flag, hoisted when the box has to be cleared.

The cheaper boxes are here illustrated. While the cost of the Canadian box is 15s., the three smaller ones shown, Nos. 1, 2, and 3, are sold at 5s., 7s., and 9s. respectively. The large one, sold at £1 1s., is a community box, for erection at the junction of the mail route and a side road on which several farmers live, or it is useful in the case of a large holding where the mail-matter is of a bulky nature. Padlocks, with three keys, are provided for 3s. 9d. for all classes of boxes.

CO-OPERATIVE EXPERIMENT RECORD.

TURNIPS, YELLOW AND WHITE FLESHED.

SOUTH ISLAND.

1911-12.

A. MACPHERSON.

KAIKOURA DISTRICT.

Manurial and Variety Tests, conducted by J. A. Coup, Kaikoura Suburban.

THE land selected was a clayey loam, uniform in character, and was in English grass for about eleven years prior to being ploughed up for the tests in November, 1911, when it was ploughed 6 in. deep. It was afterwards disc-harrowed three times, tine-harrowed twice, and rolled once at the beginning of December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Foster-ton Hybrid. In the variety test $1\frac{1}{2}$ cwt. superphosphate per acre was applied. The seeds and fertilizers were sown on the flat in rows 14 in. apart on 16th December, 1911. The roots were pulled and weighed on 25th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	£ 0 7 2	Tons. 22-30	Tons. 2-94	Gain, 12-70
2	Superphosphate, 3 cwt. ..	0 14 3	26-34	4-16	" 16-74
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	25-60	3-95	" 16-00
4	No manure ..	..	9-60	1-85	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	19-44	3-19	Gain, 9-84
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	20-70	2-56	" 11-10
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	19-19	2-43	" 9-59
8	Albatross guano, 2 cwt. ..	0 10 0	14-90	2-01	" 5-30

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—		
1	Garton's Green-top Scotch ..	Tons. 18-18	Tons. 2-40
2	" Purple-top Scotch ..	11-86	1-39
3	" Inche's Bronze-top ..	12-38	1-26
4	" Old Meldrum ..	11-52	1-01
5	" Stobo, Blue ..	15-91	1-77
6	Challenge—Waite's Eclipse ..	19-19	2-52
7	" Dale's Hybrid ..	19-95	2-64
8	Sutton's All the Year Round ..	9-09	0-50
9	" Centenary ..	25-00	1-26
10	" Early Sheepfold ..	16-67	0-75
11	" Favourite Purple-top ..	25-00	2-02
12	" Perfection Green-top ..	24-75	1-09
13	" Romney Marsh ..	31-06	1-09

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed— <i>continued</i> .	Tons.	Tons.
14	Montgomery's Aberdeen Green-top Yellow	14.65	1.51
15	" Aberdeen Purple-top Yellow	18.94	2.27
16	" Fosterton Hybrid	22.48	2.52
17	" Green-top Yellow Tankard	22.98	3.03
18	Nimmo and Blair's Challenger	13.89	1.90
	White-fleshed—		
19	Garton's Hardy Green Globe	39.40	4.29
20	Sutton's Red Paragon	14.90	1.64
21	" Early Six Weeks	31.57	2.14
22	" Purple-top Mammoth	25.25	1.77
23	" Pomeranian White Globe	19.95	1.90
24	" Imperial Green Globe	18.94	1.26
25	Montgomery's White Stone	28.79	2.78
26	" Devonshire Greystone	30.80	3.02
27	" Lincolnshire Red Globe	25.25	4.16

Inspector Goodall reports: The land was in excellent tilth to receive the seed. The sowing was completed under favourable conditions. The young plants suffered considerably from attack of the turnip flea-beetle (*Halica nemorum*), consequently the plants were rather thin in places. At time of harvesting the crop all varieties were slightly affected with turnip phoma rot (*Phoma napo-brassica*).

RANGIORA DISTRICT.

Variety Test, conducted at Rangiora Boys' High School by the Agricultural Class in charge of Mr. S. A. Clark, B.A., Assistant Master.

The tests were carried out on the school experimental area, the soil being a rich loam. Prior to the experiment the land had been for a number of years in grass. It was ploughed up in May, 1911, and dug over the following September and well cultivated. The soil in the area selected was uniform in character. The seeds were sown on the flat in rows on 19th October, 1911. No manures were applied. The roots were pulled and weighed the second week in April, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	17.21	3.90
2	" Purple-top Scotch	18.26	3.81
3	" Inche's Bronze-top	14.43	3.59
4	" Old Meldrum	10.44	2.86
5	" Stobo, Blue	16.49	3.97
6	Challenge—Waite's Eclipse	21.10	3.55
7	" Dale's Hybrid	16.80	3.73
8	Sutton's All the Year Round	17.21	2.95
9	" Centenary	21.25	2.42
10	" Early Sheepfold	28.22	2.94
11	" Favourite Purple-top	24.69	3.66
12	" Perfection Green-top	18.86	2.25
13	" Romney Marsh	25.81	2.62
14	Nimmo and Blair's Challenger	11.27	1.87
	White-fleshed—		
15	Garton's Hardy Green Globe	17.25	4.13
16	Sutton's Early Six Weeks	16.51	3.85
17	" Purple-top Mammoth	19.62	4.64
18	" Pomeranian White Globe	18.25	3.27
19	Montgomery's White Stone	18.92	4.05
20	" Lincolnshire Red Globe	18.40	3.66

LINCOLN DISTRICT.

Manurial and Variety Tests, conducted by D. Gillanders, Darfield.

The land selected was uniform in character, and was a rich loam on a clayey sub-soil. It had been in English grass from 1906 to 1909, in wheat 1910, and manured with 1 cwt. superphosphate to the acre. For the present experiment it was ploughed in July, 1911; grubbed and tine-harrowed several times in October; ploughed in December, 1911; and tine-harrowed and rolled twice in January, 1912. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 74 lb. Japanese superphosphate and 37 lb. bone manure per acre was applied. The seeds and fertilizers were sown on the flat in drills on 12th January, 1912; drills 14 in. apart. The roots were pulled and weighed on the following dates: Manurial test, 10th July, 1912; variety test, 6th August, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.	
			Roots.	Tops.		
1	Superphosphate, $\frac{3}{4}$ cwt. ..	£ s. d. 0 3 7	Tons. 9.15	Tons. 0.96	Gain,	Tons. 2.57
2	Superphosphate, $1\frac{1}{4}$ cwt. ..	0 7 2	12.85	1.70	"	6.27
3	Superphosphate, 1 cwt.; bone-dust, 42 lb. ..	0 7 0	18.00	3.05	"	11.42
4	No manure .. ..	.. ..	6.58	1.44	..	..
5	Same as No. 3 mixture; sulphate of potash, 14 lb. ..	0 8 10	14.62	1.21	Gain,	8.04
6	No. 5 mixture, $\frac{3}{4}$ cwt. ..	0 4 6	14.78	2.25	"	8.20
7	Same as No. 6 mixture; salt, 7 lb. ..	0 4 7	14.78	1.21	"	8.20
8	Albatross guano, 1 cwt. ..	0 5 0	14.46	1.70	"	7.88

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16.66	2.27
2	" Purple-top Scotch	11.36	1.51
3	" Inche's Bronze-top	9.09	2.27
4	" Old Meldrum	9.84	1.51
5	" Stobo, Blue	9.84	1.51
6	Challenge—Waite's Eclipse	10.60	1.51
7	" Dale's Hybrid	13.63	1.51
8	Sutton's All the Year Round	9.09	0.75
9	" Centenary	12.88	0.75
10	" Early Sheepfold	16.66	0.75
11	" Favourite Purple-top	28.79	1.51
12	" Perfection Green-top	18.18	0.75
13	" Romney Marsh	16.66	0.75
14	Montgomery's Aberdeen Green-top Yellow	18.18	0.75
15	" Fosterton Hybrid	25.76	1.51
16	" Green-top Yellow Tankard	25.76	1.51
17	Nimmo and Blair's Challenger	9.84	0.75
	White-fleshed—		
18	Garton's Hardy Green Globe	42.42	2.27
19	Sutton's Red Paragon	10.60	1.51
20	" Purple-top Mammoth	37.88	2.27
21	" Pomeranian White Globe	38.64	1.51
22	" Imperial Green Globe	21.21	1.51
23	Montgomery's White Stone	39.30	1.51
24	" Devonshire Greystone	21.98	1.51
25	" Lincolnshire Red Globe	39.30	2.27

Inspector Scott reports: Owing to the excessive rains of December of last year, the turnips in these tests were not sown as early as had been intended. Even at date of sowing the soil was scarcely in a free enough state. In a measure this somewhat adverse condition of soil operated against the crop right throughout the season. In some of the varieties the germination was very poor, in others very fair. In the yellow-fleshed varieties it was early apparent that Sutton's Favourite Purple-top would be the heaviest yielder. Montgomery's Fosterton Hybrid and Green-top Yellow Tankard were the next best. The latter variety grows well out of the ground, and ought to prove a suitable one to use when grass is to be sown with the turnips. Garton's Hardy Green Globe, which stood out conspicuously as the best of the white-fleshed varieties, is a firm-fleshed turnip. The two next best were Montgomery's White Stone and Lincolnshire Red Globe. Of these two the latter is the firmer turnip. Sutton's Pomeranian White Globe and Purple-top Mammoth both yielded fairly well, but both proved to be spongy in the centre.

FAIRLIE DISTRICT.

Manurial and Variety Tests, conducted by W. J. Geddings, Fairlie.

The land selected was a sandy loam on a shingly subsoil, and had been in grass prior to being ploughed up for this experiment on 1st August, 1911. It was disc-harrowed and grubbed in August, and tine-harrowed and Cambridge-rolled in November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. superphosphate per acre was applied. The seeds and fertilizers were sown in raised drills on 20th November, 1911; drills 26 in. apart. The roots were pulled and weighed on 30th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, 1½ cwt. ..	£ s. d. 0 7 2	Tons. 15.42	Tons. 1.42	Tons. Gain, 3.77
2	Superphosphate, 3 cwt. ..	0 14 3	16.77	2.23	" 5.12
3	Superphosphate, 2 cwt.; bone-dust, ¼ cwt. ..	0 14 0	21.18	2.64	" 9.53
4	No manure .. ..	.. ..	11.65	0.81	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	23.29	2.85	Gain, 11.64
6	No. 5 mixture, 1½ cwt. ..	0 8 11	15.70	2.44	" 4.05
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	19.33	1.78	" 7.68
8	Albatross guano, 2 cwt. ..	0 10 0	19.58	1.62	" 7.93

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons
1	Garton's Green-top Scotch	18.77	1.30
2	“ Purple-top Scotch	20.81	1.85
3	“ Inche's Bronze-top	15.91	1.63
4	“ Old Meldrum	12.65	2.45
5	“ Stobo, Blue	11.01	1.63
6	Challenge—Waite's Eclipse	13.87	0.81
7	“ Dale's Hybrid	12.24	0.40
8	Sutton's All the Year Round	17.09	2.04
9	“ Centenary	17.54	0.81
10	“ Early Sheepfold	24.89	1.63
11	“ Favourite Purple-top	21.22	0.40
12	“ Perfection Green-top	20.44	0.40
13	“ Romney Marsh	27.29	1.21

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed— <i>continued</i> .		
14	Montgomery's Aberdeen Green-top Yellow	Tons. 14.28	Tons. 0.81
15	" Aberdeen Purple-top Yellow	15.50	2.45
16	" Fosterton Hybrid	16.32	2.04
17	" Green-top Yellow Tankard	19.99	2.45
18	Nimmo and Blair's Challenger.. ..	14.28	0.81
	White-fleshed—		
19	Garton's Hardy Green Globe	22.85	2.04
20	Sutton's Red Paragon	24.89	2.45
21	" Early Six Weeks	17.09	1.63
22	" Purple-top Mammoth	18.77	1.21
23	" Pomeranian White Globe	16.76	1.63
24	" Imperial Green Globe	16.32	0.46
25	Montgomery's White Stone	20.81	0.81
26	" Devonshire Greystone	22.03	1.63
27	" Lincolnshire Red Globe	26.11	2.04

Inspector Manning reports: The experiments were initiated under favourable conditions, the land being in perfect order. The grub did some damage to the plants in their early growth. The weather was unfavourable from 1st January to date of harvesting, being too cold and wet. The crop was free from fungoid disease.

WAIMATE DISTRICT.

Manurial and Variety Test, conducted by G. Reynolds, Willowbridge.

The land selected was a sandy loam on a clay subsoil. It was in grass three years prior to 1910, when ploughed and crop of turnips taken. For present experiment it was skim-ploughed and tine-harrowed in October, 1911; rolled, ploughed 6 in. deep, tine-harrowed, disc-harrowed, tine-harrowed, rolled, and again tine-harrowed several times and thrown into raised drills during the first half of November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1 cwt. superphosphate per acre was applied. The seeds and fertilizers were sown in raised drills on 15th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	16.42	2.32	Gain, 6.42
2	Superphosphate, 3 cwt. ..	0 14 3	19.82	3.21	" 9.82
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	17.67	2.85	" 7.67
4	No manure	..	10.00	1.42	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	16.60	2.14	Gain, 6.60
6	No. 5 mixture, 1½ cwt. ..	0 8 11	18.57	2.32	" 8.57
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	15.00	2.32	" 5.00
8	Albatross guano, 2 cwt. ..	0 10 0	19.97	2.32	" 9.97

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	13.39	1.67
2	" Purple-top Scotch	18.21	2.67
3	" Inche's Bronze-top	11.07	1.42
4	" Old Meldrum	11.96	1.78
5	" Stobo, Blue	13.75	1.96
6	Challenge—Waite's Eclipse	16.42	1.78
7	" Dale's Hybrid	12.85	2.32
8	Sutton's All the Year Round	17.67	1.67
9	" Centenary	18.39	1.25
10	" Early Sheepfold	19.10	1.25
11	" Favourite Purple-top.. .. .	16.11	2.14
12	" Perfection Green-top	15.89	1.42
13	" Romney Marsh	14.65	1.42
14	Montgomery's Aberdeen Green-top Yellow	8.39	1.42
15	" Aberdeen Purple-top Yellow	15.89	2.14
16	" Fosterton Hybrid	15.00	2.32
17	" Green-top Yellow Tankard	17.85	2.85
18	Nimmo and Blair's Challenger.. .. .	9.46	1.60
	White-fleshed—		
19	Garton's Hardy Green Globe	25.11	2.67
20	Sutton's Red Paragon	25.35	2.50
21	" Early Six Weeks	21.42	1.96
22	" Purple-top Mammoth.. .. .	27.50	3.57
23	" Pomeranian White Globe	27.14	3.21
24	" Imperial Green Globe	23.03	1.96
25	Montgomery's White Stone	27.50	2.85
26	" Devonshire Greystone	27.14	3.21
27	" Lincolnshire Red Globe	24.28	3.03

Inspector Macdonald reports: The season during growth was particularly wet. In the manurial as well as the variety tests all roots had a healthy appearance.

OAMARU DISTRICT.

Variety Test, conducted by John Mahoney, Whitstone, Oamaru.

The land selected was a rich loam with clay and sand subsoil, and was in grass for years prior to being broken up for the present experiment. The land was ploughed and disc-harrowed twice in July, 1911; ploughed, tine-harrowed three times, and cultivated twice in August; and tine-harrowed in December, 1911. The seeds were sown in raised drills on 9th December, 1911; drills 26 in. apart. No manures were applied. The roots were pulled and weighed on 23rd May, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	29.16	3.24
2	" Purple-top Scotch	34.72	3.24
3	" Inche's Bronze-top	33.34	3.24
4	" Old Meldrum	19.98	2.70
5	" Stobo, Blue	32.41	2.77
6	Challenge—Waite's Eclipse	19.98	2.70
7	" Dale's Hybrid	31.02	2.77

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed— <i>continued</i> .		
8	Sutton's All the Year Round	Tons.	Tons.
9	" Centenary	37-04	4-63
10	" Early Sheepfold	21-76	4-63
11	" Favourite Purple-top	21-76	4-63
12	" Perfection Green-top	37-04	4-63
13	" Romney Marsh	42-13	4-63
14	Montgomery's Aberdeen Green-top Yellow	34-26	3-24
15	" Aberdeen Purple-top Yellow	29-16	3-24
16	" Fosterton Hybrid	49-54	4-63
17	" Green-top Yellow Tankard	40-74	4-63
18	Nimmo and Blair's Challenger.. .. .	40-28	4-63
	White-fleshed—		
19	Garton's Hardy Green Globe	40-28	4-63
20	Sutton's Red Paragon	46-30	4-63
21	" Early Six Weeks	47-22	4-63
22	" Purple-top Mammoth.. .. .	41-67	4-63
23	" Pomeranian White Globe	49-54	4-63
24	" Imperial Green Globe	50-93	3-24
25	Montgomery's White Stone	51-85	4-63
26	" Devonshire Greystone	51-85	4-63
27	" Lincolnshire Red Globe	54-17	4-63
		47-22	4-63

Inspector Taylor reports: Nos. 5, 14, 17, were rather deeply rooted. No. 15, a splendid sound turnip. No. 18, a very hardy and sound turnip. No. 19, very large and sound.

Manurial and Variety Tests, conducted at Waitaki Boys' High School, Oamaru.

The tests were carried out on the school experimental area, the soil being light, of rather poor quality, on a clay subsoil. It was in grass for some years prior to 1910, when it was ploughed up and a crop of potatoes taken. For present experiment it was ploughed in August, 1911, and disced and tine-harrowed several times in September, and grubbed and hoed by pupils of the agricultural class in October, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test no manures were applied. The seeds and fertilizers were sown in raised drills on 6th November, 1911; drills 26 in. apart. The roots were pulled and weighed on 14th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
			Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	£ 0 7 2	11-61	1-89	Gain, 4-59
2	Superphosphate, 3 cwt. ..	0 14 3	12-83	2-16	" 5-81
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	12-42	2-16	" 5-40
4	No manure		7-02	1-21	
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	9-45	1-62	Gain, 2-43
6	No. 5 mixture, 1½ cwt. ..	0 8 11	9-59	1-62	" 2-57
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	9-31	1-75	" 2-29
8	Albatross guano, 2 cwt. ..	0 10 0	10-80	1-62	" 3-78

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	10-26	2-16
2	" Purple-top Scotch	9-18	2-16
3	" Inche's Bronze-top	10-80	2-70
4	" Old Meldrum	8-10	2-70
5	" Stobo, Blue.. .. .	13-50	2-70
6	Challenge—Waite's Eclipse	14-58	2-70
7	" Dale's Hybrid	10-26	2-16
8	Sutton's All the Year Round	14-58	2-70
9	" Centenary	15-12	1-08
10	" Early Sheepfold	17-28	2-16
11	" Favourite Purple-top.. .. .	12-42	2-70
12	" Perfection Green-top	14-04	1-62
13	" Romney Marsh	11-90	1-62
14	Montgomery's Aberdeen Green-top Yellow	14-58	1-62
15	" Aberdeen Purple-top Yellow	12-96	2-16
16	" Fosterton Hybrid	11-90	2-70
17	" Green-top Yellow Tankard	12-42	2-16
18	Nimmo and Blair's Challenger.. .. .	8-10	1-62
	White-fleshed—		
19	Garton's Hardy Green Globe	19-44	2-70
20	Sutton's Red Paragon	17-28	1-62
21	" Early Six Weeks	16-20	1-08
22	" Purple-top Mammoth	17-28	2-16
23	" Pomeranian White Globe	16-74	1-08
24	" Imperial Green Globe	17-28	2-16
25	Montgomery's White Stone	14-58	2-70
26	" Devonshire Greystone	16-20	2-70
27	" Lincolnshire Red	18-36	3-24

Inspector Taylor reports : The sowing of the plots was carried out under favourable conditions. The diamond-back moth (*Plutella cruciferarum*) attacked the leaves during the months of March and April, but not to any extent.

PALMERSTON DISTRICT.

Manurial and Variety Tests, conducted by A. D. Gillies, Hampden.

The land selected was a clayey loam on a gravelly subsoil, and was in oats in 1910. For the present experiment it was cultivated in March, 1911; ploughed 9 in. deep in May; tine-harrowed twice in September; cultivated twice, tine-harrowed twice in October; and thrown into raised drills on 17th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Argyle guano per acre was applied. In the manurial test the seed and fertilizers were sown in raised drills on 8th November, 1911, and in the variety test the seeds and fertilizers were sown in raised drills on 18th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 17th June, 1912. Results :—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.	
			Roots.	Tops.		
		£ s. d.	Tons.	Tons.		Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	9.42	1.57	Gain,	4.19
2	Superphosphate, 3 cwt. ..	0 14 3	16.48	2.61	"	11.25
3	Superphosphate, 2 cwt.; bone-dust ¾ cwt. ..	0 14 0	15.17	2.61	"	9.94
4	No manure ..	..	5.23	2.09		
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	12.57	2.61	Gain,	7.34
6	No. 5 mixture, 1½ cwt. ..	0 8 11	15.43	2.88	"	10.20
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	16.48	2.09	"	11.25
8	Albatross guano, 2 cwt. ..	0 10 0	13.60	2.61	"	8.37

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch ..	7.85	2.09
2	" Purple-top Scotch ..	2.61	1.04
3	" Inche's Bronze-top ..	8.38	1.57
4	" Old Meldrum ..	8.64	1.83
5	" Stobo, Blue ..	8.38	2.09
6	Challenge—Waite's Eclipse ..	14.14	2.35
7	" Dale's Hybrid ..	6.80	1.57
8	Sutton's All the Year Round ..	27.20	2.88
9	" Centenary ..	9.16	1.04
10	" Early Sheepfold ..	14.14	1.30
11	" Favourite Purple-top ..	9.94	1.57
12	" Perfection Green-top ..	11.26	1.57
13	" Romney Marsh ..	8.38	1.30
14	Montgomery's Aberdeen Green-top Yellow ..	4.19	1.30
15	" Aberdeen Purple-top Yellow ..	10.20	2.09
16	" Fosterton Hybrid ..	15.19	1.57
17	" Green-top Yellow Tankard ..	12.57	2.61
18	Nimmo and Blair's Challenger ..	9.42	1.57
	White-fleshed—		
19	Garton's Hardy Green Globe ..	25.64	2.61
20	Sutton's Red Paragon ..	25.64	1.83
21	" Early Six Weeks ..	26.16	2.09
22	" Purple-top Mammoth ..	41.86	2.61
23	" Pomeranian White Globe ..	28.25	2.35
24	" Imperial Green Globe ..	29.30	2.09
25	Montgomery's White Stone ..	34.00	2.61
26	" Devonshire Greystone ..	30.35	2.09
27	" Lincolnshire Red Globe ..	27.73	2.61

Inspector Dalglish reports: The continued wet and cold weather seriously affected the root crops. In the yellow-fleshed variety test the roots were small but very sound. Plot 8, Sutton's All the Year Round, stood out very prominently on its own, the difference in appearance being very noticeable.

Variety Test, conducted by John Douglas's Trustees, Mount Royal, Palmerston.

The land selected was a clayey loam with gravelly subsoil. It was in old English grass from 1906 to 1909; skim-ploughed in January, 1910, and put in oats, August, 1910; again sown in oats, March, 1911, and fed off with sheep in October 1911. It was ploughed for this experiment 28th December, 1911, disced three times, tine-harrowed three times, and Cambridge-rolled in November, 1911. 2½ cwt. Criterion turnip-manure was applied per acre. The seeds were sown on 1st December, 1911. The roots were pulled and weighed on 28th May, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	9.52	3.26
2	" Purple-top Scotch	14.42	4.62
3	" Inche's Bronze-top	10.06	3.26
4	" Old Meldrum	21.49	3.53
5	" Stobo, Blue	12.78	3.80
6	Challenge—Waite's Eclipse	16.32	4.08
7	" Dale's Hybrid	16.33	4.08
8	Sutton's All the Year Round	8.71	2.17
9	" Centenary	12.24	1.63
10	" Early Sheepfold	18.49	2.44
11	" Favourite Purple-top	10.88	1.90
12	" Perfection Green-top	10.34	1.63
13	" Romney Marsh	12.24	1.90
14	Montgomery's Aberdeen Green-top Yellow	9.25	2.44
15	" Aberdeen Purple-top Yellow	10.06	2.44
16	" Fosterton Hybrid	15.77	3.53
17	" Green-top Yellow Tankard	15.77	4.62
18	Nimmo and Blair's Challenger	7.07	1.63
	White-fleshed—		
19	Garton's Hardy Green Globe	22.58	3.26
20	Sutton's Red Paragon	25.02	2.99
21	" Early Six Weeks	22.58	2.44
22	" Purple-top Mammoth	30.47	3.53
23	" Pomeranian White Globe	19.58	2.72
24	" Imperial Green Globe	19.58	2.99
25	Montgomery's White Stone	17.68	2.72
26	" Devonshire Greystone	16.32	2.72
27	" Lincolnshire Red Globe	16.86	2.99

Inspector Dalglish reports: The weather-conditions were adverse to good growth. Bulbs were small.

Manurial and Variety Tests, conducted by A. Murray, Dunback.

The land selected was a clayey loam with a clay subsoil. It was in grass in 1906 and 1907; broken up and put in turnips in 1908; in wheat 1909; sown in oats and grass 1910; grass-grub rendered the grass useless. It was ploughed for this experiment 6 in. deep on 8th August, 1911; cultivated twice, tine-harrowed four times, and rolled, 10th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Rockland manure per acre was applied. The seed and fertilizers were sown in raised drills on

14th November, 1911 : drills 26 in. apart. The roots were pulled and weighed on 24th June, 1912. Results :—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, 1½ cwt. ..	£ s. d. 0 7 2	Tons. 18.69	Tons. 2.61	Tons. 8.97
2	Superphosphate, 3 cwt. ..	0 14 3	22.81	2.80	Gain, 13.09
3	Superphosphate, 2 cwt.; bone-dust, ½ cwt. ..	0 14 0	22.25	2.80	„ 12.53
4	No manure .. ..	.. ..	9.72	1.68	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	19.07	2.61	Gain, 9.35
6	No. 5 mixture, 1½ cwt. ..	0 8 11	19.63	3.00	„ 9.91
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	20.93	2.61	„ 11.21
8	Albatross guano, 2 cwt. ..	0 10 0	14.95	1.86	„ 5.23

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	22.31	3.53
2	“ Purple-top Scotch	20.40	2.99
3	“ Inche's Bronze-top	13.60	2.72
4	“ Old Meldrum	13.05	2.72
5	“ Stobo, Blue	16.59	3.81
6	Challenge—Waite's Eclipse	15.23	3.26
7	“ Dale's Hybrid	14.69	2.17
8	Sutton's All the Year Round	14.69	1.63
9	“ Centenary	14.69	1.63
10	“ Early Sheepfold	14.69	3.26
11	“ Favourite Purple-top	18.50	4.35
12	“ Perfection Green-top	19.86	3.53
13	“ Romney Marsh	18.50	3.26
14	Montgomery's Aberdeen Green-top Yellow	11.42	2.72
15	“ Aberdeen Purple-top Yellow	19.04	2.99
16	“ Fosterton Hybrid	20.13	3.26
17	“ Green-top Yellow Tankard	20.13	5.44
18	Nimmo and Blair's Challenger.. ..	10.88	1.63
	White-fleshed—		
19	Garton's Hardy Green Globe	19.04	3.26
20	Sutton's Red Paragon	18.50	2.17
21	“ Early Six Weeks	22.85	3.80
22	“ Purple-top Mammoth.. ..	24.76	3.23
23	“ Pomeranian White Globe	19.58	3.53
24	“ Imperial Green Globe	25.57	3.80
25	Montgomery's White Stone	14.69	2.99
26	“ Devonshire Greystone	29.38	4.08
27	“ Lincolnshire Red Globe	22.30	4.08

Inspector Dalglish reports : In both tests the experiment was very unsatisfactory. Although a good braird, the fly or grub played havoc, with the result that there were many blanks. The wet weather greatly retarded growth, and it was impossible to give proper attention to cleaning.

Manurial and Variety Tests, conducted by Matthew Dalglish, Puketapu, Palmerston.

The land selected was marly, with a clay subsoil. It was in grass in 1906, 1907, and 1908; broken up in 1909 and a crop of wheat taken off; in turnips in 1910. It was ploughed 5 in. deep on 21st September, 1911; disced three times and rolled,

23rd September; tine-harrowed, disced twice, tine-harrowed twice, and rolled once in October, and thrown into raised drills on 11th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 3 cwt. National Mortgage and Agency Company's special turnip-manure was applied. The seeds and fertilizers were sown in raised drills on 13th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 2nd July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	29.80	4.55	Gain, 2.02
2	Superphosphate, 3 cwt. ..	0 14 3	31.82	3.28	" 4.04
3	Superphosphate, 3 cwt.; bone-dust, ¾ cwt. ..	0 14 0	32.32	3.79	" 4.54
4	No manure ..	.. ..	27.78	2.78	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	28.79	3.54	Gain, 1.01
6	No. 5 mixture, 1½ cwt. ..	0 8 11	30.81	4.55	" 3.03
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	33.34	5.05	" 5.56
8	Albatross guano, 2 cwt. ..	0 10 0	28.79	4.55	" 1.01

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16.42	4.04
2	" Purple-top Scotch	18.94	3.54
3	" Inche's Bronze-top	18.69	4.54
4	" Old Meldrum	14.65	4.04
5	" Stobo, Blue	13.63	3.03
6	Challenge—Waite's Eclipse	15.65	2.50
7	" Dale's Hybrid	18.43	3.03
8	Sutton's All the Year Round	19.44	3.54
9	" Centenary	19.44	2.90
10	" Early Sheepfold	19.70	2.78
11	" Favourite Purple-top	21.21	2.58
12	" Perfection Green-top	17.80	2.02
13	" Romney Marsh	19.19	2.27
14	Montgomery's Aberdeen Green-top Yellow	21.47	3.54
15	" Aberdeen Purple-top Yellow	28.28	3.91
16	" Fosterton Hybrid	29.29	3.28
17	" Green-top Yellow Tankard	28.28	6.56
18	Nimmo and Blair's Challenger	21.33	3.28
	White-fleshed—		
19	Garton's Hardy Green-Globe	33.34	6.82
20	Sutton's Red Paragon	30.30	7.82
21	" Early Six Weeks	29.29	6.56
22	" Purple-top Mammoth	27.27	6.31
23	" Pomeranian White Globe	24.75	6.31
24	" Imperial Green Globe	26.01	5.81
25	Montgomery's White Stone	31.06	6.82
26	" Devonshire Greystone	24.24	6.56
27	" Lincolnshire Red Globe	26.77	6.31

Inspector Dalgliesh reports: The land was not as clean as it should be for the experiment, and the wet season prevented the necessary intercultivation being given during the growth of the crop to keep the weeds in check.

MOSGIEL DISTRICT.

Manurial and Variety Tests, conducted by Charles Forsyth, Table Hill, Mosgiel.

The land selected was a light loam with clay subsoil, and was situated sixteen miles from the sea-coast. It was in English grass in 1908; in turnips 1909; in oats 1910; in turnips 1911. For this experiment it was ploughed 6 in. deep on 1st June, 1911; double-dised, tine-harrowed, and double-dised in October, 1911; double-dised on 26th November, 1911; disced and tine-harrowed on 5th January, 1912. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Surprise Island guano and $\frac{3}{4}$ cwt. bonedust per acre were applied. The seeds and fertilizers were sown in raised drills on 9th January, 1912; drills 26 in. apart. The roots were pulled and weighed on 23rd July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	0 7 2	25.63	6.00	Gain, 22.36
2	Superphosphate, 3 cwt. ..	0 14 3	22.91	6.54	" 19.64
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	18.54	4.36	" 15.27
4	No manure	..	3.27	5.45	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	26.18	4.36	Gain, 22.91
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	39.27	7.63	" 36.00
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	58.91	9.80	" 55.64
8	Albatross guano, 2 cwt. ..	0 10 0	56.73	10.91	" 53.46

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	14.72	2.72
2	" Purple-top Scotch	12.54	2.72
3	" Inche's Bronze-top	14.18	3.27
4	" Old Meldrum	14.72	3.81
5	" Stobo, Blue	19.09	3.27
6	Challenge—Waite's Eclipse	16.36	3.81
7	" Dale's Hybrid	20.18	3.81
8	Sutton's All the Year Round	14.18	2.72
9	" Centenary	10.91	1.63
10	" Early Sheepfold	8.72	1.09
11	" Favourite Purple-top	18.00	3.27
12	" Perfection Green-top	13.63	3.27
13	" Romney Marsh	27.27	4.36
14	Montgomery's Aberdeen Green-top Yellow	18.54	3.81
15	" Aberdeen Purple-top Yellow	25.63	4.36
16	" Fosterton Hybrid	9.27	2.72
17	" Green-top Yellow Tankard	22.91	4.36
18	Nimmo and Blair's Challenger	12.00	4.90
	White-fleshed—		
19	Garton's Hardy Green Globe	19.09	3.27
20	Sutton's Red Paragon	13.63	3.29
21	" Early Six Weeks	18.00	2.72
22	" Purple-top Mammoth	30.00	4.36
23	" Pomeranian White Globe	23.45	3.81
24	" Imperial Green Globe	23.45	2.18
25	Montgomery's White Stone	24.00	3.27
26	" Devonshire Greystone	23.45	3.27
27	" Lincolnshire Red Globe	20.18	3.81

Inspector McLeod reports: Owing to the wet weather the turnips were not sown until 9th January, 1912, being rather too late a date for the district. Heavy rain set in after being sown, causing a stoppage of the growth. The grub did considerable damage to plants in the manurial plots and also among the variety plots. The land was well worked and in good condition to receive the seed, but owing to the unfavourable weather experienced and the ravages of the grub the yield was under the normal.

BALCLUTHA DISTRICT.

Variety Test, conducted by Joseph Mosley, Inch-Clutha, Stirling.

The land selected for the experiment was a sandy loam, and was in grass in 1906, in turnips 1907-8, in wheat 1909, and in oats 1910. It was ploughed for this experiment on 8th February, 1911; cultivated and tine-harrowed on 8th February; disced, ploughed on 4th April; ploughed 6 in. on 10th July and 9th September; cultivated and tine-harrowed on 9th September; ploughed on 10th October; tine-harrowed on 12th October and 28th December, 1911. In the test 2 cwt. Challenge manure per acre was applied. The seeds and fertilizers were sown in raised drills on 29th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 20th June, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31-01	12-78
2	" Purple-top Scotch	26-52	11-42
3	" Inche's Bronze-top	19-86	8-16
4	" Old Meldrum	22-30	9-25
5	" Stobo, Blue	27-13	10-88
6	Challenge—Waite's Eclipse	28-02	11-15
7	" Dale's Hybrid	28-83	8-51
8	Sutton's All the Year Round	33-73	5-30
9	" Centenary	44-61	11-42
10	" Early Sheepfold	29-51	6-80
11	" Favourite Purple-top	33-46	10-61
12	" Perfection Green-top	26-25	5-44
13	" Romney Marsh	37-68	10-88
14	Montgomery's Aberdeen Green-top Yellow	22-71	9-25
15	" Aberdeen Purple-top Yellow	28-70	11-97
16	" Fosterton Hybrid	31-42	10-88
17	" Green-top Yellow Tankard	31-01	15-77
18	Nimmo and Blair's Challenger	21-62	8-97
	White-fleshed—		
19	Garton's Hardy Green Globe	36-45	12-24
20	Sutton's Red Paragon	34-27	10-61
21	" Early Six Weeks	42-84	10-61
22	" Purple-top Mammoth	32-64	5-98
23	" Pomeranian White Globe	41-08	13-87
24	" Imperial Green Globe	41-62	8-43
25	Montgomery's White Stone	42-98	13-05
26	" Devonshire Greystone	33-59	10-33
27	" Lincolnshire Red Globe	29-11	11-97

Manurial and Variety Tests, conducted by Adam Houlston, Kakapuaka.

The land selected was a clayey loam, and was in lea for six years previously to being ploughed up on 4th April, 1911. It was double-disced on 16th October, and grubbed on 20th October, 1911; tine-harrowed on 9th November, and Cambridge-rolled on 18th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2½ cwt. per acre of Surprise Island guano was applied. The seeds and fertilizers were sown in raised drills

on 23rd November, 1911; drills 26 in. apart. The roots were pulled and weighed on 18th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	26·25	3·26	Gain, 10·47
2	Superphosphate, 3 cwt. ..	0 14 3	22·85	2·33	„ 7·07
3	Superphosphate, 2 cwt.; bone-dust, ½ cwt. ..	0 14 0	26·12	2·72	„ 10·34
4	No manure ..	..	15·78	1·76	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	25·71	2·17	Gain, 9·93
6	No. 5 mixture, 1½ cwt. ...	0 8 11	22·72	2·04	„ 6·94
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	19·45	1·90	„ 3·67
8	Albatross guano, 2 cwt. ..	0 10 0	20·67	1·90	„ 4·89

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch ..	20·67	3·12
2	„ Purple-top Scotch ..	20·54	2·85
3	„ Inche's Bronze-top ..	20·94	2·85
4	„ Old Meldrum ..	17·68	1·36
5	„ Stobo, Blue ..	19·31	3·12
6	Challenge—Waite's Eclipse ..	18·09	2·58
7	„ Dale's Hybrid ..	23·73	2·44
8	Sutton's All the Year Round ..	21·35	3·06
9	„ Centenary ..	21·49	2·10
10	„ Early Sheepfold ..	20·40	1·97
11	„ Favourite Purple-top ..	23·46	2·44
12	„ Perfection Green-top ..	20·26	1·90
13	„ Romney Marsh ..	19·45	1·90
14	Montgomery's Aberdeen Green-top Yellow ..	12·92	2·24
15	„ Aberdeen Purple-top Yellow ..	22·24	3·33
16	„ Fosterton Hybrid ..	21·62	2·31
17	„ Green-top Yellow Tankard ..	20·54	3·26
18	Nimmo and Blair's Challenger ..	14·41	1·63
	White-fleshed—		
19	Garton's Hardy Green Globe ..	27·47	2·58
20	Sutton's Red Paragon ..	21·22	1·90
21	„ Early Six Weeks ..	18·02	1·70
22	„ Purple-top Mammoth ..	31·83	2·72
23	„ Pomeranian White Globe ..	24·75	2·44
24	„ Imperial Green Globe ..	28·43	1·97
25	Montgomery's White Stone ..	21·22	2·10
26	„ Devonshire Greystone ..	21·76	2·17
27	„ Lincolnshire Red Globe ..	21·76	2·31

Manurial and Variety Tests, conducted by James Hyslop, Greenfield.

The land selected for the experiment was shingly, and was in oats in 1910, prior to which it had been in lea for six years. It was ploughed for this experiment on 20th June, 1911, 4 in. deep; tine-harrowed on 2nd November; disc-ploughed on 6th December; tine-harrowed and grubbed on 7th December, 1911. In the manurial

test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test $1\frac{1}{2}$ cwt. Challenge and $\frac{1}{2}$ cwt. turnip-starter was applied per acre. The seeds and fertilizers were sown in raised drills on 27th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 28th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	0 7 2	10.61	2.99	Gain, 3.54
2	Superphosphate, 3 cwt. ..	0 14 3	16.32	2.72	" 9.25
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	18.50	2.99	" 11.43
4	No manure ..	0 0 0	7.07	1.36	" ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	13.33	2.72	Gain, 6.26
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ...	0 8 11	14.96	3.26	" 7.89
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	14.69	2.99	" 7.52
8	Albatross guano, 2 cwt. ..	0 10 0	15.50	1.90	" 8.43

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
	Yellow-fleshed—		
1	Garton's Green-top Scotch ..	10.33	2.99
2	" Purple-top Scotch ..	16.05	4.08
3	" Inche's Bronze-top ..	12.51	3.26
4	" Old Meldrum ..	14.41	3.53
5	" Stobo, Blue ..	14.14	4.62
6	Challenge—Waite's Eclipse ..	13.05	3.80
7	" Dale's Hybrid ..	13.05	5.16
8	Sutton's All the Year Round ..	11.69	2.44
9	" Centenary ..	15.23	3.53
10	" Early Sheepfold ..	17.68	3.53
11	" Favourite Purple-top ..	17.95	4.62
12	" Perfection Green-top ..	19.86	3.53
13	" Romney Marsh ..	25.02	5.44
14	Montgomery's Aberdeen Green-top Yellow ..	17.13	4.62
15	" Aberdeen Purple-top Yellow ..	7.88	2.99
16	" Fosterton Hybrid ..	15.23	3.80
17	" Green-top Yellow Tankard ..	17.13	6.25
18	Nimmo and Blair's Challenger ..	16.86	4.89
	White-fleshed—		
19	Garton's Hardy Green Globe ..	25.84	5.98
20	Sutton's Red Paragon ..	19.86	2.06
21	" Early Six Weeks ..	22.58	3.53
22	" Purple-top Mammoth ..	36.45	7.07
23	" Pomeranian White Globe ..	13.60	3.53
24	" Imperial Green Globe ..	21.22	3.53
25	Montgomery's White Stone ..	27.20	5.16
26	" Devonshire Greystone ..	19.86	4.89
27	" Lincolnshire Red Globe ..	28.56	8.43

Manurial and Variety Tests, conducted by Jasper Clark, Lovell's Flat.

The land selected for the experiment was a clayey loam, and was in lea 1906–8 in wheat 1909, in oats 1910. It was ploughed for this experiment 7 in. deep on 4th

April, 1911; double-diseed and double-grubbed in October; tine-harrowed and Cambridge-rolled on 18th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test $1\frac{1}{2}$ cwt. Kempthorne Prosser's special turnip-manure and $1\frac{1}{2}$ cwt. basic slag per acre was applied. The seeds and fertilizers were sown in raised drills on 20th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	0 7 2	32.10	3.80	Gain, 23.40
2	Superphosphate, 3 cwt. ..	0 14 3	32.37	2.85	„ 23.67
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	30.74	2.85	„ 22.04
4	No manure ..	..	8.70	1.36	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	30.74	2.99	Gain, 22.04
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	22.31	2.44	„ 13.61
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	22.31	2.44	„ 13.61
8	Albatross guano, 2 cwt. ..	0 10 0	27.20	2.85	„ 18.50

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
	Yellow-fleshed—		
1	Garton's Green-top Scotch ..	25.57	8.16
2	„ Purple-top Scotch ..	23.66	6.52
3	„ Inche's Bronze-top ..	23.12	7.61
4	„ Old Meldrum ..	24.48	5.71
5	„ Stobo, Blue ..	30.74	8.16
6	Challenge—Waite's Eclipse ..	25.02	4.62
7	„ Dale's Hybrid ..	25.02	8.16
8	Sutton's All the Year Round ..	26.38	6.80
9	„ Centenary ..	30.74	6.25
10	„ Early Sheepfold ..	21.49	2.99
11	„ Favourite Purple-top ..	31.83	5.16
12	„ Perfection Green-top ..	20.94	2.99
13	„ Romney Marsh ..	31.28	4.08
14	Montgomery's Aberdeen Green-top Yellow ..	19.58	4.21
15	„ Aberdeen Purple-top Yellow ..	19.86	5.16
16	„ Fosterton Hybrid ..	22.03	5.30
17	„ Green-top Yellow Tankard ..	25.30	8.70
18	Nimmo and Blair's Challenger ..	18.22	5.71
	White-fleshed—		
19	Garton's Hardy Green Globe ..	39.99	7.61
20	Sutton's Red Paragon ..	32.10	4.62
21	„ Early Six Weeks ..	28.56	4.89
22	„ Purple-top Mammoth ..	42.16	6.39
23	„ Pomeranian White Globe ..	36.72	6.39
24	„ Imperial Green Globe ..	26.66	2.99
25	Montgomery's White Stone ..	37.00	6.39
26	„ Devonshire Greystone ..	41.35	8.02
27	„ Lincolnshire Red Globe ..	38.90	10.88

Manurial and Variety Tests, conducted by Thomas Lowery, Lovell's Flat.

The land selected for the experiment was a clayey loam, and was in turnips in 1906. in wheat 1907, in oats 1908, and in lea 1909-10. It was ploughed 8 in. deep on 12th July, 1911; grubbed on 6th November; tine-harrowed on 7th November; grubbed on 16th November; tine-harrowed on 28th November; and clod-crushed on 16th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Surprise Island guano per acre was applied. The seeds and fertilizers were sown in the manurial test on 19th December, and the variety test on 20th December, 1911, in raised drills 26 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, 1½ cwt. ..	£ s d. 0 7 2	Tons. 16.86	Tons. 1.63	Gain, 7.07
2	Superphosphate, 3 cwt. ..	0 14 3	16.59	1.36	" 6.80
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	16.05	2.17	" 6.26
4	No manure .. ..	.. ..	9.79	1.36	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	17.68	2.17	Gain, 7.89
6	No. 5 mixture, 1½ cwt. ..	0 8 11	17.95	1.90	" 8.16
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	18.22	1.90	" 8.43
8	Albatross guano, 2 cwt. ..	0 10 0	15.23	1.90	" 5.44

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31.01	11.01
2	" Purple-top Scotch	32.23	9.79
3	" Inche's Bronze-top	25.43	9.52
4	" Old Meldrum	23.94	8.29
5	" Stobo, Blue.. ..	22.03	8.16
6	Challenge—Waite's Eclipse	28.70	9.79
7	" Dale's Hybrid	25.98	7.88
8	Sutton's All the Year Round	26.52	4.76
9	" Centenary	29.92	4.62
10	" Early Sheepfold	31.55	3.80
11	" Favourite Purple-top	25.43	5.44
12	" Perfection Green-top	23.39	4.35
13	" Romney Marsh	28.56	4.08
14	Montgomery's Aberdeen Green-top Yellow	15.23	3.26
15	" Aberdeen Purple-top Yellow	17.13	3.26
16	" Fosterton Hybrid	19.58	3.80
17	" Green-top Yellow Tankard	20.54	4.62
18	Nimmo and Blair's Challenger.. ..	17.13	3.80
	White-fleshed—		
19	Garton's Hardy Green Globe	28.02	4.08
20	Sutton's Red Paragon	22.03	2.72
21	" Early Six Weeks	23.66	2.99
22	" Purple-top Mammoth	36.45	3.94
23	" Pomeranian White Globe	22.30	2.72
24	" Imperial Green Globe	22.98	1.76
25	Montgomery's White Stone	24.89	4.08
26	" Devonshire Greystone	20.94	2.99
27	" Lincolnshire Red Globe	23.94	4.21

LAWRENCE DISTRICT.

Manurial and Variety Tests, conducted by J. and W. Smith, Waitanuna West.

The land selected was a sandy loam on a free loamy subsoil, and had been in English grass for six years prior to being ploughed up 6 in. deep on 20th May, 1911, for this experiment. Disc-harrowed four times and tine-harrowed twice on 7th December, 1911, and thrown into ridges with double-mould plough on 11th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Perfection manure was applied per acre. The seeds and fertilizers were sown on 11th and 12th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 27th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
1	Superphosphate, 1½ cwt. ..	£ s. d. 0 7 2	Tons. 16.86	Tons. 3.94	Tons. Gain, 7.89
2	Superphosphate, 3 cwt. ..	0 14 3	18.36	5.16	„ 9.39
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	21.35	5.57	„ 12.38
4	No manure ..	..	8.97	2.85	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	24.89	5.30	Gain, 15.92
6	No. 5 mixture, 1½ cwt. ..	0 8 11	18.77	3.87	„ 9.80
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	14.28	3.06	„ 5.31
8	Albatross guano, 2 cwt. ..	0 10 0	14.89	2.51	„ 5.92

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
Yellow-fleshed—		Tons.	Tons.
1	Garton's Green-top Scotch	15.50	5.44
2	„ Purple-top Scotch	19.86	5.44
3	„ Inche's Bronze-top	18.50	5.71
4	„ Old Meldrum	19.86	6.25
5	„ Stobo, Blue	23.66	8.16
6	Challenge—Waite's Eclipse	20.13	5.44
7	„ Dale's Hybrid	22.84	8.43
8	Sutton's All the Year Round	16.05	2.72
9	„ Centenary	25.30	4.89
10	„ Early Sheepfold	23.39	2.72
11	„ Favourite Purple-top	22.30	3.53
12	„ Perfection Green-top	21.22	3.26
13	„ Romney Marsh	28.56	4.08
14	Montgomery's Aberdeen Green-top Yellow	18.22	4.08
15	„ Aberdeen Purple-top Yellow	20.40	4.62
16	„ Fosterton Hybrid	22.84	5.71
17	„ Green-top Yellow Tankard	19.04	5.71
18	Nimmo and Blair's Challenger	19.04	4.08
White-fleshed—			
19	Garton's Hardy Green Globe	32.91	6.52
20	Sutton's Red Paragon	24.21	4.08
21	„ Early Six Weeks	23.66	2.17
22	„ Purple-top Mammoth	35.09	5.71
23	„ Pomeranian White Globe	26.66	4.35
24	„ Imperial Green Globe	26.38	3.53
25	Montgomery's White Stone	17.68	2.54
26	„ Devonshire Greystone	25.84	4.89
27	„ Lincolnshire Red Globe	29.11	6.25

Inspector Barron reports: The land was in fair order to receive the seed, but required more cultivation for an ideal seed-bed for a root crop. The weather during period of growth was changeable, rain and high winds predominating. Little inter-cultivation could be given the crop owing to land being too wet.

TAPANUI DISTRICT.

Manurial and Variety Tests, conducted by Alexander Ferguson, Kelso.

The land selected was a clayey loam on a clay subsoil, and has been in cultivation for the last thirty-six years. In 1903 was in turnips with $1\frac{1}{2}$ cwt. manure; 1904 in oats; 1905 in oats with $1\frac{1}{2}$ cwt. manure; 1906 in turnips with $2\frac{1}{4}$ cwt. manure; 1907 in oats; 1908 fallowed; 1909 to 1911 in pasture. Digger-ploughed to 9 in. for this experiment in August, 1911; deeply cultivated with cultivator six times, October to December, 1911; harrowed to fine tilth and rolled immediately before sowing, December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test $2\frac{1}{2}$ cwt. Challenge special turnip-manure was applied per acre. The seeds and fertilizers were sown on 18th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 14th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.	
			Roots.	Tops.		
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	£ 7 2	Tons. 28-02	Tons. 5-71	Gain, ..	Tons. 3-00
2	Superphosphate, 3 cwt. ..	0 14 3	23-12	5-16	Loss, ..	1-90
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	29-11	5-98	Gain, ..	4-09
4	No manure ..	.. ..	25-02	4-62	.. ..	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	29-65	5-44	Gain, ..	4-63
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	25-30	4-61	.. ..	0-28
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	24-21	4-61	Loss, ..	0-81
8	Albatross guano, 2 cwt. ..	0 10 0	25-57	5-16	Gain, ..	0-55

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
1	Yellow-fleshed—	Tons. 23-66	Tons. 5-71
2	Garton's Green-top Scotch	23-66	5-44
3	" Purple-top Scotch	17-95	3-53
4	" Inche's Bronze-top	27-20	6-52
5	" Old Meldrum	19-86	4-61
6	" Stobo, Blue	31-55	6-52
7	Challenge—Waite's Eclipse	27-20	6-25
8	" Dale's Hybrid	18-77	2-44
9	Sutton's All the Year Round	30-19	3-80
10	" Centenary	23-66	3-26
11	" Early Sheepfold	26-65	4-35
12	" Favourite Purple-top	21-49	2-44
13	" Perfection Green-top	24-75	2-99
	" Romney Marsh .. ..	.. ..	.. ..

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed— <i>continued</i> .	Tons.	Tons.
14	Montgomery's Aberdeen Green-top Yellow	22-03	4-62
15	" " Aberdeen Purple-top Yellow	23-66	5-44
16	" " Fosterton Hybrid	28-29	6-25
17	" " Green-top Yellow Tankard	26-93	6-25
18	Nimmo and Blair's Challenger	22-85	4-61
	White-fleshed—		
19	Garton's Hardy Green Globe	36-72	5-98
20	Sutton's Red Paragon	21-49	3-80
21	" " Early Six Weeks	24-21	3-26
22	" " Purple-top Mammoth	35-91	5-98
23	" " Pomeranian White Globe	33-46	5-44
24	" " Imperial Green Globe	31-28	4-08
25	Montgomery's White Stone	27-20	4-61
26	" " Devonshire Greystone	27-47	5-98
27	" " Lincolnshire Red Globe	33-46	8-16

Inspector McCulloch reports: At time of sowing the land was in splendid order, and weather favourable to good braird. As season advanced it became very wet and rather cold to admit of good growth. The whole crop was very healthy and was well cared for during the period of growth.

Manurial and Variety Tests, conducted by A. McIntyre, Kelso.

The land selected for the experiment was a clayey loam with a stiff clay subsoil. It was in grass for seven years prior to being broken up for this experiment in June, 1911, when it was digger-ploughed; disced twice, grubbed once, tine-harrowed four times, and rolled in November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Challenge special turnip-manure per acre was applied. The seeds and fertilizers were sown in drills on 11th December, 1911; drills 14 in. apart. The roots were pulled and weighed on 13th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt.	0 7 2	25-84	6-25	Gain, 15-51
2	Superphosphate, 3 cwt.	0 14 3	31-83	5-16	" 21-50
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	25-84	5-16	" 15-51
4	No manure .. .. .	.. .. .	10-33	4-89	.. .. .
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	25-30	7-34	Gain, 14-97
6	No. 5 mixture, 1½ cwt.	0 8 11	25-30	2-17	" 14-97
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	21-22	3-98	" 10-89
8	Albatross guano, 2 cwt.	0 10 0	22-30	4-89	" 11-97

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	9-52	2-72
2	" Purple-top Scotch	13-05	2-72
3	" Inche's Bronze-top	9-52	1-90
4	" Old Meldrum	10-88	2-99
5	" Stobo, Blue	14-14	2-99
6	Challenge—Waite's Eclipse	13-33	2-44
7	" Dale's Hybrid	12-24	2-99
8	Sutton's All the Year Round	14-96	2-17
9	" Centenary	19-58	2-44
10	" Early Sheepfold	18-21	2-44
11	" Favourite Purple-top	15-23	2-17
12	" Perfection Green-top	14-14	1-63
13	" Romney Marsh	19-31	2-17
14	Montgomery's Aberdeen Green-top Yellow	10-33	1-90
15	" Aberdeen Purple-top Yellow	12-51	2-99
16	" Fosterton Hybrid	14-14	2-17
17	" Green-top Yellow Tankard	12-51	2-99
18	Nimmo and Blair's Challenger.. .. .	9-25	2-17
	White-fleshed—		
19	Garton's Hardy Green Globe	20-94	2-99
20	Sutton's Red Paragon	18-50	1-90
21	" Early Six Weeks	16-32	1-35
22	" Purple-top Mammoth.. .. .	22-85	2-72
23	" Pomeranian White Globe	19-86	2-99
24	" Imperial Green Globe	22-03	2-44
25	Montgomery's White Stone	16-86	2-17
26	" Devonshire Greystone	15-77	2-17
27	" Lincolnshire Red Globe	16-05	2-99

Inspector McCulloch reports: Varieties—There was a good seed-bed at time of sowing. These variety tests were sown on land lying directly away from the sun, consequently with the extremely wet season experienced, together with the want of sufficient heat, the yields were no doubt much affected, and growth was consequently slow. Manures—These were sown on land well prepared, with a good north-easterly aspect, and growth was good all the season. Both crops were quite healthy.

Manurial and Variety Tests, conducted by D. Rogers, Tapanui.

The land selected was a clayey loam on a clay subsoil, and was in pasture for three years previous to breaking out of lea for this experiment in June, 1911. It was disced four times in November, 1911; tine-harrowed four times and chain-harrowed once in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 3 cwt. National Mortgage and Agency Company's Perfect turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 3rd January, 1912; drills 28 in. apart. The roots were pulled and weighed on 27th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	32.64	12.24	Gain, 13.60
2	Superphosphate, 3 cwt. ..	0 14 3	23.94	7.61	" 4.90
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	26.38	7.07	" 7.34
4	No manure ..	..	19.04	6.80	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	25.30	7.61	Gain, 6.26
6	No. 5 mixture, 1½ cwt. ..	0 8 11	17.68	7.88	Loss, 1.36
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	24.48	9.52	Gain, 5.44
8	Albatross guano, 2 cwt. ..	0 10 0	25.57	8.97	" 6.53

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch ..	16.86	4.62
2	" Purple-top Scotch ..	30.74	8.16
3	" Inche's Bronze-top ..	20.94	6.52
4	" Old Meldrum ..	16.59	2.99
5	" Stobo, Blue. ..	22.30	4.08
6	Challenge—Waite's Eclipse ..	25.02	5.71
7	" Dale's Hybrid ..	23.39	8.16
8	Sutton's All the Year Round ..	5.71	1.35
9	" Centenary ..	22.58	3.26
10	" Early Sheepfold ..	23.39	2.99
11	" Favourite Purple-top ..	19.31	3.80
12	" Perfection Green-top ..	17.41	2.99
13	" Romney Marsh ..	28.29	3.80
14	Montgomery's Aberdeen Green-top Yellow ..	19.31	4.35
15	" Aberdeen Purple-top Yellow ..	26.38	6.25
16	" Fosterton Hybrid ..	22.03	5.16
17	" Green-top Yellow Tankard ..	23.39	6.52
18	Nimmo and Blair's Challenger ..	19.31	4.89
	White-fleshed—		
19	Garton's Hardy Green Globe ..	30.19	4.89
20	Sutton's Red Paragon ..	16.86	1.90
21	" Early Six Weeks ..	22.03	1.63
22	" Purple-top Mammoth ..	34.27	4.89
23	" Pomeranian White Globe ..	27.20	3.80
24	" Imperial Green Globe ..	22.03	2.17
25	Montgomery's White Stone ..	25.02	2.72
26	" Devonshire Greystone ..	28.29	3.80
27	" Lincolnshire Red Globe ..	26.11	4.89

Inspector McCulloch reports: All varieties braided well with the exception of No. 8, which must have been rather thinly sown. The seed-bed at time of sowing was in good tilth. Thorough intercultivation was given during the season. The date of sowing was rather late for the district, as the growing-period was rather too short. However, the land having a nice northerly aspect, a good crop free from disease resulted.

Manurial and Variety Tests, conducted by Robert Kinaston, Roxburgh.

The land selected was a light clay loam on light clay subsoil, and was in grass in 1907, in oats 1908, in mangels and turnips 1909, part in oats and part in potatoes in 1910. It was ploughed for this experiment in December, and harrowed, grubbed, harrowed twice, and rolled in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Kempthorne, Prosser, and Co.'s turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 23rd December, 1911; drills 26 in. apart. The roots were pulled and weighed on 24th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	19-58	3-53	..
2	Superphosphate, 3 cwt. ..	0 14 3	20-40	3-26	Gain, 0-82
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	23-39	4-35	.. 3-81
4	No manure ..	.. ..	19-58	4-08	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	24-21	6-25	Gain, 4-63
6	No. 5 mixture, 1½ cwt. ..	0 8 11	23-94	6-80	.. 4-36
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	23-39	5-71	.. 3-81
8	Albatross guano, 2 cwt. ..	0 10 0	25-30	10-06	.. 5-72

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
	Yellow-fleshed—		
1	Garton's Green-top Scotch ..	16-59	4-08
2	" Purple-top Scotch ..	13-05	2-72
3	" Inche's Bronze-top ..	13-33	2-72
4	" Old Meldrum ..	12-51	2-72
5	" Stobo, Blue ..	14-96	3-80
6	Challenge—Waite's Eclipse ..	18-21	4-08
7	" Dale's Hybrid ..	16-32	3-26
8	Sutton's All the Year Round ..	21-76	3-80
9	" Centenary ..	19-58	2-72
10	" Early Sheepfold ..	17-13	2-17
11	" Favourite Purple-top ..	15-77	2-72
12	" Perfection Green-top ..	16-32	2-72
13	" Romney Marsh ..	15-77	2-99
14	Montgomery's Aberdeen Green-top Yellow ..	12-78	2-99
15	" Aberdeen Purple-top Yellow ..	15-23	2-99
16	" Fosterton Hybrid ..	14-14	2-99
17	" Green-top Yellow Tankard ..	20-94	4-35
18	Nimmo and Blair's Challenger ..	12-78	2-44
	White-fleshed—		
19	Garton's Hardy Green Globe ..	26-65	3-80
20	Sutton's Red Paragon ..	26-93	3-26
21	" Early Six Weeks ..	23-94	3-26
22	" Purple-top Mammoth ..	25-57	3-53

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
White-fleshed— <i>continued</i> .		Tons.	Tons.
23	Sutton's Pomeranian White Globe	20·67	3·26
24	„ Imperial Green Globe	24·48	2·99
25	Montgomery's White Stone	26·38	4·08
26	„ Devonshire Greystone	31·01	4·35
27	„ Lincolnshire Red Globe	32·92	5·16

Inspector McCulloch reports: Both in the manurial and variety tests there was a good braird. Seasonable weather followed, consequently the crops were good and sound.

Manurial and Variety Tests, conducted by Robert Potts, Crookston.

The land selected was a clayey loam on clay subsoil, and in 1903 was in turnips, in 1904 wheat, in 1905 oats and grass, in 1906 to 1910 in pasture. Ploughed for this experiment on 6th June, 1911, and sown with 4½ cwt. of ground lime per acre, and in the middle of August sown again with 4 cwt. of lime per acre. Disc-harrowed in June: disc-harrowed and clod-crushed in October, 1911; harrowed immediately before sowing in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Mataura turnip-fertilizer per acre was applied. The seeds and fertilizers were sown in raised drills on 4th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 17th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	23·94	6·80	Gain, 3·27
2	Superphosphate, 3 cwt. ..	0 14 3	28·56	9·79	„ 7·89
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	31·28	8·16	„ 10·61
4	No manure .. ..	.. ..	20·67	6·80	.. ..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	38·63	10·33	Gain, 17·96
6	No. 5 mixture, 1½ cwt. ..	0 8 11	29·92	7·61	„ 9·27
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	32·64	10·33	„ 11·97
8	Albatross guano, 2 cwt. ..	0 10 0	15·23	5·44	Loss, 5·44

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31·55	7·61
2	„ Purple-top Scotch	31·55	8·43
3	„ Inche's Bronze-top	23·94	4·61
4	„ Old Meldrum	23·39	5·16
5	„ Stobo, Blue	23·39	5·44
6	Challenge—Waite's Eclipse	31·01	6·25
7	„ Dale's Hybrid	31·28	5·28

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed— <i>continued</i> .	Tons.	Tons.
8	Sutton's All the Year Round	13-05	2-44
9	" Centenary	39-90	5-71
10	" Early Sheepfold	31-01	4-08
11	" Favourite Purple-top	26-38	4-35
12	" Perfection Green-top	26-93	3-80
13	" Romney Marsh	31-01	3-26
14	Montgomery's Aberdeen Green-top Yellow	20-13	4-35
15	" Aberdeen Purple-top Yellow	25-84	4-89
16	" Fosterton Hybrid	28-29	4-89
17	" Green-top Yellow Tankard	24-21	5-71
18	Nimmo and Blair's Challenger	20-40	4-61
	White-fleshed—		
19	Garton's Hardy Green Globe	38-91	5-16
20	Sutton's Red Paragon	33-19	4-08
21	" Early Six Weeks	35-91	3-53
22	" Purple-top Mammoth	39-44	4-89
23	" Pomeranian White Globe	26-38	4-89
24	" Imperial Green Globe	27-75	3-80
25	Montgomery's White Stone	34-55	4-89
26	" Devonshire Greystone	39-44	6-52
27	" Lincolnshire Red Globe	38-36	5-98

Inspector McCulloch reports: The land was in excellent tilth to receive the seed. In the manurial test the braird was very good. In the variety test it was far too thin, and appeared as if the seedling was not heavy enough. The cold wet weather at time of sowing and brairding no doubt also had an injurious effect. The crop grew well after being established, and was healthy.

Manurial and Variety Tests, conducted by G. M. Love, Moa Flat, Heriot.

The land selected was a clayey loam on clay subsoil, and was in pasture nine years previous to 1906, in turnips 1907, in oats 1908, grass crop 1909, in pasture 1910–11; ploughed out of lea for this experiment in June, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test $1\frac{1}{2}$ cwt. Rockland turnip-manure was applied per acre. The seeds and fertilizers were sown on 6th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 9th July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, $1\frac{1}{2}$ cwt. ..	0 7 2	26-11	6-80	Gain, 3-26
2	Superphosphate, 3 cwt. ..	0 14 3	27-20	5-71	" 4-35
3	Superphosphate, 2 cwt.; bone-dust, $\frac{3}{4}$ cwt. ..	0 14 0	26-93	4-35	" 4-08
4	No manure	..	22-85	4-61	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	21-76	2-44	Loss, 1-03
6	No. 5 mixture, $1\frac{1}{2}$ cwt. ..	0 8 11	23-66	4-08	Gain, 0-81
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	26-38	4-35	" 3-53
8	Albatross guano, 2 cwt. ..	0 10 0	14-14	2-44	Loss, 8-71

VARIETY TEST.

Plot.	Variety.				Crop per Acre.	
					Roots.	Tops.
	Yellow-fleshed—				Tons.	Tons.
1	Garton's Green-top Scotch	..	..	..	13-60	1-90
2	" Purple-top Scotch	..	..	..	23-94	2-44
3	" Inche's Bronze-top	..	..	..	13-33	2-17
4	" Old Meldrum	..	..	..	9-52	0-80
5	" Stobo, Blue	..	..	..	9-52	1-36
6	Challenge—Waite's Eclipse	..	..	..	9-27	1-36
7	" Dale's Hybrid	..	..	..	12-24	2-44
8	Sutton's All the Year Round	..	..	..	11-97	1-36
9	" Centenary	..	..	..	9-79	0-80
10	" Early Sheepfold	..	..	..	16-86	1-36
11	" Favourite Purple-top	..	..	..	8-70	0-80
12	" Perfection Green-top	..	..	..	20-67	2-17
13	" Romney Marsh	..	..	..	13-60	1-90
14	Montgomery's Aberdeen Green-top Yellow	..	..	..	11-69	0-80
15	" Aberdeen Purple-top Yellow	..	..	..	12-24	2-17
16	" Fosterton Hybrid	..	..	..	17-13	2-99
17	" Green-top Yellow Tankard	..	..	..	16-32	2-99
18	Nimmo and Blair's Challenger	..	..	..	19-04	3-80
	White-fleshed—					
19	Garton's Hardy Green Globe	..	..	..	30-47	1-90
20	Sutton's Red Paragon	..	..	..	20-13	1-63
21	" Early Six Weeks	..	..	..	20-94	1-08
22	" Purple-top Mammoth	..	..	..	30-74	2-99
23	" Pomeranian White Globe	..	..	..	17-41	1-63
24	" Imperial Green Globe	..	..	..	33-19	1-08
25	Montgomery's White Stone	..	..	..	28-29	3-26
26	" Devonshire Greystone	..	..	..	30-74	3-53
27	" Lincolnshire Red Globe	..	..	..	37-81	4-89

Inspector McCulloch reports: In the manurial test the braird and quality of the turnips was good. In the variety test the braird of plots Nos. 1 to 18 was poor, and the quality in most cases only fair.

Manurial and Variety Tests, conducted by Mark McAuley, Tapanui.

The land selected was a clayey loam on a clay subsoil. In 1906 it was in turnips, in 1907 fallow, in 1908 oats, in 1909-10 grass. Ploughed out of lea for this experiment in July, 1911; disced in July, 1911; disced twice, tine-harrowed, and clod-crushed in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Mataura turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 19th December, 1911; drills 28 in. apart. The roots were pulled and weighed on 25th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	12.51	2.72	Gain, 4.08
2	Superphosphate, 3 cwt. ..	0 14 3	15.50	3.53	7.07
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt. ..	0 14 0	12.78	2.99	4.35
4	No manure ..	.. ..	8.43	1.90	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb. ..	0 17 9	14.96	3.80	Gain, 6.53
6	No. 5 mixture, 1½ cwt. ..	0 8 11	10.88	2.44	2.45
7	Same as No. 6 mixture; salt, 14 lb. ..	0 9 2	13.33	2.99	4.90
8	Albatross guano, 2 cwt. ..	0 10 0	14.96	3.53	6.53

VARIETY TEST.

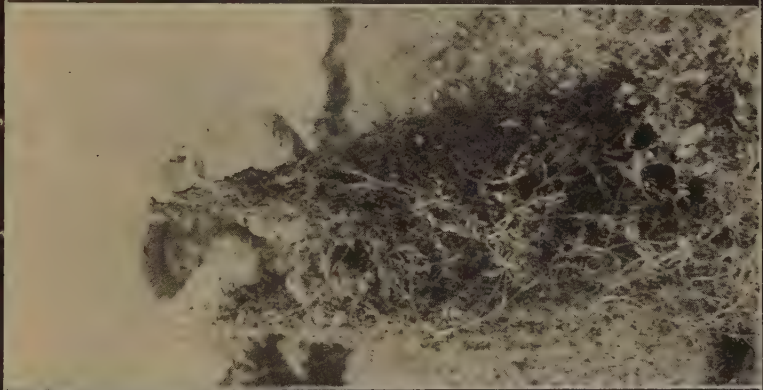
Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
		Tons.	Tons.
1	Yellow-fleshed—Garton's Green-top Scotch ..	10.88	1.90
2	" Purple-top Scotch ..	11.97	2.17
3	" Inche's Bronze-top ..	11.69	1.36
4	" Old Meldrum ..	9.52	1.36
5	" Stobo, Blue ..	10.33	1.63
6	Challenge—Waite's Eclipse ..	11.15	1.90
7	" Dale's Hybrid ..	12.78	1.63
8	Sutton's All the Year Round ..	11.69	2.17
9	" Centenary ..	13.60	2.44
10	" Early Sheepfold ..	10.06	1.90
11	" Favourite Purple-top ..	16.05	2.44
12	" Perfection Green-top ..	11.69	1.90
13	" Romney Marsh ..	15.77	1.90
14	Montgomery's Aberdeen Green-top Yellow ..	7.34	1.63
15	" Aberdeen Purple-top Yellow ..	8.43	2.17
16	" Fosterton Hybrid ..	6.52	1.35
17	" Green-top Yellow Tankard ..	8.70	2.17
18	Nimmo and Blair's Challenger ..	7.34	1.90
	White-fleshed—		
19	Garton's Hardy Green Globe ..	17.41	2.17
20	Sutton's Red Paragon ..	16.86	1.63
21	" Early Six Weeks ..	20.67	2.44
22	" Purple-top Mammoth ..	17.95	1.35
23	" Pomeranian White Globe ..	15.77	1.63
24	" Imperial Green Globe ..	20.67	1.90
25	Montgomery's White Stone ..	18.50	1.35
26	" Devonshire Greystone ..	14.41	1.35
27	" Lincolnshire Red Globe ..	15.23	2.17

Inspector McCulloch reports: The land was well prepared to receive the seed at time of sowing, but owing to the nature of the soil being rather cold and inclined to be sour, together with the season being wet and cold, the crop made poor growth. Sorrel consequently got away, as the ground could not at any time be cultivated after the crop was sown owing to the moisture retained in the land. There is no doubt that the nature of the season affected the ground, and consequently the yield of the crop. The quality of the turnips on being cut was good in both the manurial and variety tests, and free from disease.

CO-OPERATIVE EXPERIMENTS AT PATEA CARRIED OUT BY MR. WILLIAM ARUNDELL.



A PLOT OF CHOU MOELLIER.



VICIA VILLOSA, IMPORTED FROM U.S.A.
GROWN FOR SEED.



SELECTED WHITE BELGIAN CARROTS.
GROWN FOR SEED.

G. de S. Bayles, photo.]

NORTH ISLAND.—MARTON PLOTS.

G. DE S. BAYLIS.

These Marton plots have been utilized, in the first place, for the purpose of making such tests as were possible without the employment of much time or labour, or any special treatment in the way of deep cultivation; and, secondly, to harvest and acclimatize a small lot of various seeds recently introduced from other countries by the Department, so as to obviate their reimportation should co-operative experimenters not be successful in securing a good foundation stock from their small trials.

The following is a list of the seeds imported for Marton plots. The initial stocks were tested and grown on Marton plots, and parcels are now procurable on the market, or are obtainable from growers.

Wheats from Australia: Federation, Yandilla King, Comeback, Power's Fife, Tarragon, John Brown.

Wheats from Sweden: Grenadier, Swedish Pearl.

Wheats from Canada: Imperial Amber, Turkey Red, White Fife, Red Fife.

Oats from Sweden: Victory, White Ligowo, Beardless Propsteier.

Oats from England: Triumph.

Barley from Sweden: Hannchen, Swan-neck.

Federation, one of the first wheats introduced, is now largely grown in the Rangitikei, and on many farms has ousted the variety formerly grown—viz., Marshall White. Many of the others are doing very well, and the Canadian, which are the most recent varieties introduced, are highly spoken of by those who grew them last season.

Oats: Both varieties did well in the Wairarapa last season, and all the seed procurable has been resown, there being considerable demand for it.

Barleys: Hannchen is well spoken of, and was being advertised by the trade for the first time this season since its introduction. Swan-neck has proved the better for feeding purposes on the trial plots this season. Unfortunately, the stock of seed has nearly run out. The situation, however, is saved by the fact that a small area will be harvested on Marton plots this season.

CROPS GROWN ON VARIOUS PLOTS DURING SEASONS 1910-11.

Plot.	Crop.	Yield.	Plot.	Crop.	Yield.
<i>Season 1910-11.</i>					
1	Yandilla King wheat ..	39½ bushels.	17	Algerian oats ..	39 bushels.
1X	John Brown wheat ..	34½ bushels.	18	White Ivory peas ..	19½ bushels.
2	Red Marvel wheat ..	22 bushels.	19	Oats and peas ..	1 ton 16 cwt. 2 qr. chaff.
3	Solid Straw Tuscan wheat	40 bushels.	20	Maize ..	..
3X	Red Tuscan wheat ..	40 bushels.	21	Blue Imperial peas ..	16½ bushels.
4	Red Marvel wheat ..	22 bushels.	22	Soya beans ..	..
5	Pearl wheat ..	22½ bushels.	23	Early Winter peas ..	24½ bushels.
5X	Hunter's wheat ..	29½ bushels.	23x	Partridge-peas ..	23½ bushels.
6	Cape barley ..	..	24	Velvet beans ..	..
7	White Marvel wheat ..	26 bushels.	25	Tick-beans ..	..
7X	Comeback wheat ..	25 1-10 bushels	26	Cow-peas ..	..
8	Cape barley ..	..	27	Canadian Yellow Flint maize and Blue Prussian peas	1,600 lb. dry forage and 25 bushels peas.
9	Velvet Ear wheat ..	30½ bushels.	27x	Virginian Horse-tooth maize and partridge- peas	2,028 lb. dry forage and 19 bushels peas.
9X	Federation wheat ..	28½ bushels.	28	Early Amber Cane sor- ghum	10 tons (green).
10	Hannchen barley ..	..	29	Maize (variety) ..	..
11	Bore wheat ..	Did not ma- ture.	30	Millets (variety) ..	..
11X	Grenadier wheat ..	12½ bushels.	31	Mixed pasture ..	..
12	Hannchen barley ..	..			
13	Swedish Pearl ..	4 bushels.			
13X	Beardless Propsteier oats	31 bushels.			
14	Swan-neck barley ..	..			
15	White Ligowo ..	31 bushels.			
15X	Victory oats ..	37 bushels.			
16	Swan-neck barley ..	..			
17	Triumph oats ..	44 bushels.			

CROPS GROWN ON VARIOUS PLOTS DURING SEASONS 1911-12, 1912-13.

Plot.	Crop.	Yield.	Plot.	Crop.	Yield.
<i>Season 1911-12.</i>					
1, 1X	Red Fife wheat ..	49½ bushels.	17, 17X	John Brown wheat ..	43 bushels.
2	Soya beans ..	..	18	John Brown wheat ..	..
3, 3X	Hannchen barley ..	73½ bushels.	19	Imperial Amber wheat ..	44 bushels.
4	Buda kale ..	..	20	Grenadier wheat ..	53½ bushels.
5, 5X	Buda kale ..	..	21	Grenadier wheat ..	53½ bushels.
6	Curly Luculas beet ..	..	22	Hannchen barley ..	61 4-5 bshls.
7, 7X	Triumph oats ..	74½ bushels.	23, 23X	Federation wheat ..	52 bushels.
8	Silver-beet ..	..	24	Swan-neck barley ..	57 bushels.
9, 9X	White Fife wheat ..	47½ bushels.	25	Turkey Red wheat ..	51 5-6 bshls.
10	Sutton's Silver-beet ..	..	26	Triumph oats ..	51 bushels.
11, 11X	Tares, Victory oats, rye-corn, Tick-beans (mixture)	16 tons (green).	27, 27X	Yandilla King wheat ..	46 bushels.
12	Propsteier oats and tares	17½ tons.	28	Beardless Propsteier oats	42½ bushels.
13, 13X	Triumph oats and tares	15½ tons.	29	Red Tuscan wheat ..	43½ bushels.
14	Velvet and Soya beans	..	30	Victory oats ..	55½ bushels.
15, 15X	Comeback wheat ..	29½ bushels.	31	Mixed pasture ..	..
16	White Ivory peas (part of south portion inoculated)	..	..	Helianthi ..	..
<i>Season 1912-13.</i>					
1, 1X	Perennialized Italian rye ..	..	17, 17X	Algerian oats ..	..
2	Common Italian rye ..	..	18	Algerian oats (computed with plot 17)	..
3, 3X	Western Woths grass ..	..	19	Grenadier wheat ..	..
4	Azof barley ..	..	20	Grenadier wheat ..	..
5, 5X	Mixed pasture ..	..	21	Black Russian barley, followed by John Brown wheat	..
6	Common rye-corn, followed by Swan-neck barley	..	22	Black Russian barley (stands for seed)	..
7, 7X	Common rye-corn, followed by White Fife wheat	..	23, 23X	White Russian barley, followed by Webb's Black Challenge oats	..
8	Emerald rye-corn, followed by Comeback wheat	..	24	White Russian barley (stands for seed)	..
9, 9X	Emerald rye-corn ..	..	25	Cape barley, followed by American Wonder peas	..
10	Carter's Red Admiral wheat	..	26	Cape barley (stands for seed)	..
11, 11X	Red Fife wheat ..	..	27, 27X	Hannchen barley, followed by Victory oats	..
12	Turkey Red wheat ..	..	28	Hannchen barley (stands for seed)	..
13, 13X	Dun oats, ½ acre; Burgoyne wheat, ½ acre	..	29	Swan-neck barley ..	..
14	White Ligowo oats ..	..	30	Black Bountiful oats ..	..
15, 15X	Carter's Stand-up wheat, ½ acre; Regenerated Abundance oats, ½ acre	..	31	Mixed pasture ..	..
16	Carter's Red Admiral wheat	..	..	Helianthi ..	..

In addition to testing suitability and nature of varieties, the plots at Marton have mainly been utilized in order to supply the initial stocks to outside experimenters until these are established upon the market.

The seventh Waikato Winter Show will be held at Hamilton from the 3rd to 7th June, inclusive.

The Ruakura Southdown and English Leicester ewes were put to the rams on the 23rd January.

Germany is becoming more and more dependent for food-supplies on foreign suppliers. The butter imports from Denmark within the last decade have risen by nearly 10,000,000 lb.

PASTURES AND CROPS.

JANUARY.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month:—

BAY OF ISLANDS.—A severe drought has prevailed here, practically from October, and rain still seems as far away as ever. It has had a disastrous effect upon the crops and pastures of the volcanic soils around the Bay of Islands, and has severely affected the dairying industry. The other three northern counties have been favoured with a few showers occasionally, and in consequence the pastures and crops are much better. The fly has been very troublesome this summer to the flockowners, who have had to resort to shearing their lambs to prevent disastrous results. Turnip crops are badly in want of rain.—*W. J. Dunlop.*

WHANGAREI.—There was practically no rain last month. Pastures are all dried up, and at the present time there is apparently no prospect of the drought breaking. This is the longest period of dry weather in the north for many years. All grain crops are in the stack now, and grass-seeding has commenced.—*A. P. Speedy.*

AUCKLAND.—When the old year departed a strong north-easter blew, which brought threatening weather. New Year's morning opened with dull and cloudy weather, followed by rain which fell at intervals during the day. The air was sultry. The spell of fine weather enjoyed for weeks previously broke, and it seemed as if unfavourable weather was about to set in. The squally weather made things unpleasant, and right up to the 8th it rained heavily on and off. Then it cleared up, and fine days followed, which allowed harvesting operations to proceed apace. Farmers were not slow to take advantage of the fine weather in getting their crops secured, which they did, with few exceptions, in splendid condition. The greater portion is now stacked, and some of the crops that are intended to be kept over are nicely thatched. The majority of the crops of oats, wheat, and barley were fairly heavy. Rye-grass crops were also good, and yields of good clean seed is reported. The pea crops have also been very good, particularly in the Auckland District. The farmers have also paid considerable attention to cultivating and preparing their land for root crops. Turnips, mangels, carrots, and other small crops are beginning to make splendid headway since the late rains set in. The pasture country is also freshened. Stock are still in fair condition. The factories are going well, although the dry weather retarded the milk-supply. The milk test is about the average.—*R. Rowan.*

TE AROHA.—Last month was remarkably dry, there being only two light rainfalls, which freshened the root crops, but not enough to make any decided improvement in pastures. Excellent crops of hay and oats have been harvested. A few plots of spring-sown oats are not yet quite ready. Turnips and rape crops are fair throughout, but a good fall of rain is badly needed to give the crops a fair start. Root crops are practically free of the fly, &c., so far. Potatoes are good generally, and there is no trace of blight to date.—*J. L. Morris.*

HAMILTON.—Beneficial rains at the beginning of the month: hot and dry weather during the remainder, with the exception of a few heavy showers in the last week. Grain crops are being harvested, and are light, owing to the wet spring and late sowing. Root crops are looking remarkably well, and potatoes are very free from blight up to the present.—*J. Kerr.*

KING-COUNTRY.—The weather was favourable for all harvesting operations. Some good crops of hay and oats have been stacked. In some parts of the district root crops could have done with more moisture, but, taken on the whole, turnips and mangels are showing fair growth. The bush-burning has been carried out under satisfactory conditions.—*B. Bayly.*

OHAKUNE.—The month opened with heavy rain on the night of the 1st, and from then on—the 28th and 31st excepted—exceptionally dry and warm weather was experienced. Pastures throughout the district are amply providing for all classes of stock. Owing to the lengthy spell of dry weather, late-sown turnips have not made the same headway as those sown earlier, but on the whole root crops throughout the district present a satisfactory appearance. Cocksfoot is well filled and headed, and should the present favourable conditions for seed-saving continue the produce of a large area should be on the market before the end of February. Exceptionally good bush-burns have been obtained throughout the district, and farmers are at present busy sowing the different seeds thereon. Oat crops are looking remarkably well and are gradually reaching their final stages of maturity.—*P. Barry.*

BAY OF PLENTY.—Some heavy rain fell early in the month, which was badly needed. Pastures and maize crops have since come along wonderfully, but still maize is much later than usual. Potato crops throughout the district are affected with blight, very few escaping. Harvesting is just completed, and about the average crops of oats have been obtained.—*John Case.*

NEW PLYMOUTH.—The New Year brought a welcome rain, which continued during the first week, followed by a fortnight's fine weather, and then a very changeable week. Most of the hay and ensilage has been made, and the yield is well up to the average. Pastures are looking particularly well. There is an abundance of feed. The root crops as a whole are below the average: many are very patchy. The late-sown turnips promise to be far better than the early. Maize is looking well.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—The fine dry weather of last month was very favourable for hay-making, burning, &c., but it began to affect the pastures, and the milk-supply was on the decrease and turnips at a standstill. During the early part of the month very heavy rain fell, which freshened up all vegetation and saved the late-sown turnips, mangels, &c. During the rest of the month we had fine weather with intervals of good rain. The farmers' winter feed is now well assured.—*Austin F. Wilson.*

MANGAWERA.—The past month was an exceptionally good one for farmers in this district. Opportunities were given to those who had bush to burn, and good use was made of them. Nice rains fell throughout, dispelling all fears of a drought. Old pastures have browned up considerably, but are still supplying a great quantity of fattening-feed. Potatoes so far are free from blight, and good crops are expected. Cocksfoot looks very prolific this summer, cutting being now in full swing. All stock are in good condition.—*J. A. Melrose.*

POVERTY BAY.—The weather was very hot and dry during January. There is fair feed on the inland hill country, but near the coast pastures are rather short and dried up. Water for stock is short in some localities. There will be good crops of maize, as they got a fair start before the very dry weather set in. Settlers are taking advantage of the dry weather to get fires through the logs and standing dry trees, and a considerable area of bush country has thereby received a good clearing of useless timber that has hampered mustering and other work.—*William Ross.*

WAIROA.—Exceptionally hot weather prevailed throughout the district during the past month, to a great extent parching up the face of the country and thereby withering the pastures, but there still remains an ample sufficiency for all needs. The season's oat crops for this county ought to prove record ones, whilst all root crops grown have thrived well. A few days' good rain at the present time would be greatly appreciated by the majority of farmers in the district. Stock of all classes are doing well.—*T. F. Mullaly.*

WAIPIKURAU.—The weather this month was very dry over the whole of the district, and feed is getting very dry and parched. Rain fell on two days only, and, drying winds following, all the moisture that had fallen has been evaporated, leaving the ground as dry as before.—*H. O. M. Christie.*

PAHIATUA.—Total rainfall for the month, 5.51 in. Rain fell on seventeen days, the heaviest fall being 1.56 in., on the 1st. Corresponding month of last year 1.52 in., rain falling on fifteen days, the heaviest fall being 0.42 in., on the 12th. The rain during the month retarded the harvesting a little; but, on the other hand, the district has derived great benefit from the moisture, as it has given the pastures and root crops a good start. The north-west winds, however, retarded growth on the wind-swept hills.—*T. Bacon.*

NORTH WAIRARAPA.—The past month was very sultry and dry, pastures and all green crops suffering accordingly. In the Eketahuna district there were occasional

showers, which were of great value to stockowners, and there is abundance of feed. Within the vicinity of Masterton the country is dry. On the 27th instant the weather broke, and a fair amount of rain fell, which was wanted. Turnips and rape were suffering before the rain fell, but will now recover. Stock throughout the district are looking well. Harvesting is well advanced. I expect wheat will be good, and oats about the average.—*J. S. Rankin.*

MASTERTON.—During the month of January we had twenty-five days of very hot dry weather, but rain fell on the 27th and 28th, and had a very beneficial effect upon the rape crops, many of which had been languishing for want of nourishment. Farmers took advantage of the fine weather to harvest their crops, and I anticipate a very fair yield of both oats and wheat. Caterpillars made their appearance and did a good deal of damage, oats suffering the most. Algerians appear to resist the ravages of the pest. I also notice the turnip-fly has done considerable damage, and in some cases the turnips have had to be resown. There have been some excellent crops of good clean cocksfoot-seed saved this year, and a lot of really good seed has been allowed to go to waste. There were some very good crops of early potatoes, and the present crops are looking very well. Feed is plentiful throughout the district.—*T. C. Webb.*

WELLINGTON.—The weather during January was generally mild and pleasant, a few days warm steady rains freshening up pastures, which were browning rapidly. All crops of oats, turnips, and maize are also looking well. All classes of stock are in good condition, although in the past few days the milk-supply has declined.—*G. H. Jenkinson.*

BLENHEIM.—The weather during the month was very hot and dry until the 28th, when there was a set-back to winter, snow falling on most of the high country, and the temperature falling to nearly freezing-point that night, changing again yesterday (30th) to summer. Harvesting is nearly finished—a week or two will see the end—and already a quantity of oats has been cut for chaff. Owing to the lateness of the frosts, the yield of peas is below the average; in some cases they were so poor that threshing operations had to cease.—*F. H. Brittain.*

SEDDON.—The weather-conditions for the month of January were very favourable both from harvesting and grazing points of view. Rain fell on five days at intervals, which all pastures sorely needed, and did not interfere with threshing operations. There have been record crops of barley, ranging from 50 to 67 bushels per acre. Most farmers in this district are fortunate in having a considerable amount of rape on hand, enabling them to hold lambs pending settlement of the freezing-works dispute.—*E. T. Sinclair.*

NELSON.—The weather for the month was changeable. Heavy showers of rain fell on several days, which improved the pastures and green, root, and late corn crops. Though the total rainfall for the month was 3 in., more is wanted, the strong hot winds having dried up the country to a certain extent. There is still a fair amount of corn to be harvested, and some of the late crops have not been cut yet.—*Gilbert Ward.*

WESTLAND.—Weather-conditions throughout last month were most unseasonable for the time of the year, and, instead of getting warm summer weather, it was more like winter most of the time. There were nineteen wet days, and the rainfall to date (29th) has been 6.61 in., the maximum fall being on the 20th, when 1.42 in. was recorded. Agricultural pursuits were considerably hampered, and in a good many instances crops which should have been cut are still standing; while in other cases they are spoilt, owing to inability to stack through continual wet weather. This is very unfortunate, as the settler on the West Coast largely depends on his hay for feed for stock through the winter months. There is a coating of snow on the high country, and present appearances point to an early autumn.—*H. J. Walton.*

KAIKOURA.—During the earlier part of last month exceptionally hot and dry weather prevailed, the country thereby becoming too dry for green crops. Rains falling on the 22nd, 28th, and 31st benefited these greatly, and they are now coming on well. Grain crops, generally speaking, are good throughout the district, and are being got together in good condition. Potatoes promise to be a fair crop.—*William S. Goodall.*

ASHBURTON.—Very warm weather was experienced in the early part of the month, 90 degrees of heat being registered. On the 27th a very heavy hailstorm passed over the lower portion of the district, which completely threshed out some of the oat crops. 2.70 in. of rain fell during the month, which will greatly help the turnip and rape crops.—*C. Branigan.*

FAIRLIE.—A very unfavourable month—very dry, windy weather. All crops have suffered. Harvesting has commenced, and is much earlier than was expected; a good many crops have only half filled. It is expected that oats will be scarce. Rain fell during the last week in the month, which did a lot of good to the root crops, but came too late for the grain.—*W. B. Manning.*

TIMARU.—The weather was very unsettled during the month of January, great heat, heavy wind, snow on the hill country, and some heavy rains which were badly wanted. Harvest is in full swing, and a large quantity of grass has been made into hay this season.—*J. C. Huddleston.*

WAIMATE.—The weather during the past month was most changeable, heat and cold, rain, hail, and winds being general. Cereal crops in some localities look well, but, speaking generally, yields are not expected to be up to last season's. Smut and fly are much in evidence, but the chief cause of any shortage in yield may be put down to weather-conditions, which have been anything but suitable for some considerable time for agricultural pursuits. Pastures have held out well, and feed generally is good, particularly on high country. All classes of stock are looking well. Root crops look encouraging, more particularly on areas which have been well cultivated. Co-operative field experiments under supervision of the Department with both oats and wheat look well. More interest is now being taken in these experiments by farmers generally. Clovers have this season grown well, and it is expected that more grass-seed than usual will be harvested. Peas, beans, and rape are doing well.—*F. A. Macdonald.*

KUROW.—The north-west winds that prevailed during last month were very detrimental to growing crops, the hot dry weather having caused cereals to ripen prematurely, and where crops were exposed to the wind considerable loss resulted through shaking. Although the past month was unfavourable for growth, some splendid crops of wheat, barley, and oats are to be seen on the Otekaike Settlement and in the Hakataramea Valley, and the yields give promise of being quite up to the average of last year, providing no further loss is caused by winds, &c. Welcome rain fell on the 20th and 26th, which will greatly benefit root crops, and also help to revive the burnt pastures. Shearing is mostly finished in this district, and sheepowners have had record clips and record prices for their wool. The Waitaki River has been in high flood during the last week, and losses of cattle and horses off the islands are reported.—*G. Reid.*

OMARU.—The weather last month ran to extremes: a week or so of hot north-west winds—the thermometer registering 84 degrees in the shade—followed by cold southerly gales and rains for the latter part of the month. Harvesting has started, but is not yet general. It is to be expected that the yields of oats and wheat will not reach a very high standard this season. Potatoes are not coming on very well. The district of Kauroo Hill seems to be ahead of the lower country for crops, &c., this season.—*W. F. Flower.*

PALMERSTON SOUTH.—The first half of the month was very dry and warm, the 19th being the hottest day since February, 1909. The outlook was not very promising, harvest coming in too fast, pastures burning up, and turnip crops on the verge of failure for want of rain. During the last fortnight we had a pleasant change, periodically heavy rains freshening up pastures greatly and saving many turnip crops. Crops throughout the district are below the average and not well filled, though better around the coast than inland. Turnip crops are poor, but may be expected to do better after the recent rains. Potatoes are not very promising, and the blight has made its appearance. Total rainfall, 2.81 in.—*C. S. Dalgliesh.*

DUNEDIN.—The weather during January for the first part was warm and dry. During the last week there were good rains, but, unfortunately, the high winds spoiled the effect, and a good deal of grain has been shaken. The pastures are beginning to go off a little. Turnips are backward owing to lateness in sowing. Potatoes are fair, and little or no blight is reported in this district. There was an abundant hay harvest, and on the whole the dairy-farmer has a fair prospect for the autumn and winter.—*J. R. Renton.*

MOSGIEL.—During the month of January the weather was very mixed, with heavy rain-showers and hail, checking the growth considerably. The blight has made its appearance among the potato crops throughout the district. Harvesting has started, but is not yet general. Small birds are playing havoc with early-sown crops.—*H. McLeod.*

STRATH TAIERI.—During the early part of January the weather was very hot, with several days of warm winds which dried up vegetation. The cereal crops are good.

although some of the oats whitened off rather than ripened. The early turnips are promising well, but those late sown are going to be light. Grass is still abundant, and stock of all kinds are in splendid condition.—*W. Scott.*

MANIOTOTO.—From the 20th December up to the 26th January the district was subjected to very dry weather, accompanied by hot winds. This had the effect of drying up the grass and stunting all kinds of crops. Since yesterday (26th) we have had a splendid fall of rain, and it is still coming down, with no appearance of clearing. Stock of all kinds, especially sheep, are in fine condition.—*A. T. N. Simpson.*

CLYDE.—The weather for the month of January was very dry until the latter end, when we were treated to a good shower or two of rain, but not enough to do the district any good as regards the advancement of crops.—*Thomas N. Baxter.*

LAWRENCE.—The weather was extremely hot, with drying winds in the first portion of the month. The effect was to bring the grain crops on too rapidly, therefore they will be mostly light both in straw and yield. Turnips have also suffered with the dry spell. The fly has been very severe in some cases, and also the grub. Stock of all descriptions are looking well. Harvest will be considerably earlier than last year.—*R. Barron.*

BALCLUTHA.—During the month heavy gales prevailed, and much damage was done to crops and fruit. A good downpour of rain is badly needed. Pastures have gone back considerably, but there is still sufficient feed for stock. Harvest will be light this season, as the crops are filling very poorly. Early turnips are looking very well. Potatoes have come on well, but blight has started in places through the district. Some fine crops of rye-grass in the district. The rainfall for the month was 2.60 in., rain falling on fifteen days, the heaviest fall (68 points) being on the 20th. Total rainfall for the year 1912, 25½ in.—*H. A. Munro.*

OWAKA.—The weather for January was dry and warm. Crops of all kinds made good growth. Hay was stacked in first-class condition. Pastures are good, and feed is plentiful everywhere. Potatoes came on extremely well, but, unfortunately, blight has made a slight appearance in some crops. Swedes are most satisfactory, and soft turnips are also looking well.—*Robert McGillivray.*

GORE.—During the past month we experienced some very high winds, causing considerable damage to some of the grass crops, as well as burning up the pastures considerably. Grass harvesting is well advanced, and threshing has started in some places, and the seed should be saved in good order. Grain crops are looking well, and, given good weather, harvesting should start about the middle of the present month. The yields will not on the whole be so heavy as last year. Turnips are looking exceptionally well, and there is promise at present of a plentiful supply of feed during the coming winter.—*B. Grant.*

LUMSDEN.—The weather for January was anything but seasonable. During the first week we experienced nice warm sunny days, and then we had gusty boisterous winds and incessant bitter showers occasionally, accompanied by hail, and towards the end of the month there was very warm weather with hot drying winds which at times increased to a strong gale, causing a deal of damage to the grass crops by shaking out the seed. Oat crops are very short, and the yield will be very light. Turnips are looking remarkably well, a much larger area being sown this season. The strong winds we are getting will cause a small yield in grass-seed in many cases.—*W. S. S. Cantrell.*

INVERCARGILL.—January was a good growing month. The oat crop lengthened considerably, and turnips look well. The grass harvest is perhaps on the light side. Feed is still fairly plentiful, but is going back. This is the season of the year when a stack of ensilage on the farm would be of great value in keeping up the milk-supply. The country at present is looking well. Potatoes never looked better.—*J. R. Whyborn.*

OTAUTAU.—The early part of the month was fine and warm—in fact, almost too dry. After such a long spell of wet weather the ground became hard and caked, but latterly some fine showers came and everything was benefited by them. One particularly fine crop of oats is growing on Ringway, which, I should say, will thresh 100 bushels if not more—so far the best in the district.—*H. F. Dencker.*

QUEENSTOWN.—The weather for the month was very changeable at times—even within the twenty-four hours we experienced the weather suitable for the four periods. A fair amount of rain fell, which in some districts has been the actual salvation of grain crops, &c.; but, generally speaking, pastures, &c., have not benefited to any great extent in consequence of the continual, and in most cases cold, southerly winds following and drying up the moisture within a few hours.—*A. Clarke.*

THE FRUIT CROP.

THE officers of the Orchards, Gardens, and Apiaries Division report as follows regarding the condition of the fruit crop at the end of January:—

WHANGAREI.—Apples, medium crop; lemons, medium; nectarines, light; peaches, heavy to medium; pears, heavy crop; plums (English), light; plums (Japanese), medium; oranges, light to medium; tomatoes, fair crop. Owing to dry spell all fruits are coming off small.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, good average crop; lemons, looking well; peaches, good crop; pears, good crop; plums (English), light to medium crop; plums (Japanese), heavy crop; tomatoes, looking well.—*W. C. Thompson.*

AUCKLAND SOUTH.—Apples, good crop early varieties, light to good of late varieties; nectarines, good crop; peaches, light to good crop; pears, light crop. Plums (English), good crop; plums (Japanese), light to good crop; tomatoes, good crop.—*N. R. Pierce.*

HAMILTON.—Apples, fair average crop; lemons, rather light crop; nectarines, fair average crop; peaches, medium crop of good quality; pears, good average crop; plums (English), light crop, but of good quality; plums (Japanese), crop light and below the average; tomatoes, fair average crop; walnuts, very poor crop.—*T. E. Rodda.*

POVERTY BAY.—Apples, crop little below average; lemons, poor crop; nectarines, average crop; peaches, average crop; pears, heavy crop; plums (English), above average crop; plums (Japanese), average crop only; tomatoes, good crop.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, medium crop; nectarines, good crop; peaches, average crop; pears, medium crop; plums (both varieties), heavy crop; tomatoes, medium crop.—*George Stratford.*

HASTINGS.—Apples, moderate to light crop; nectarines, heavy crop; peaches, heavy crop; pears, heavy crop; plums (English), heavy crop; plums (Japanese), heavy crop; tomatoes, looking fair; walnuts, very good crop.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop; nectarines, poor crop; peaches, poor crop; pears, average to heavy crop; plums (English and Japanese), heavy crop; tomatoes, average crop.—*T. C. Webb, jun.*

NELSON.—Apples, crop looking well; nectarines, very good crop; peaches, fair crop; pears, medium crop; plums (English), very fair crop; plums (Japanese), not so heavy as usual; tomatoes, crop good; walnuts, large crop.—*J. H. Thorp.*

CHRISTCHURCH.—Apples, good crop; nectarines, light crop; peaches, light crop; pears, fair crop; plums (English), good crop; plums (Japanese), fair crop; tomatoes, good crop; walnuts, poor crop.—*W. J. Courtier.*

TIMARU.—Apples, light crop; peaches, very light crop; pears, good crop; plums (English), fair crop; plums (Japanese), light crop; tomatoes, good crop.—*A. B. Mansfield.*

DUNEDIN.—Apples, crop looking well, good crop; nectarines, fair crop; peaches, very light crop; pears, good crop; plums (English and Japanese), very good crop; tomatoes, crop looking well.—*W. T. Goodwin.*

Victorian fruitgrowers have booked shipping-space in oversea steamers for 421,683 cases of fruit, an amount which, it is expected, will almost equal that of the export from Tasmania, where the crop is said to be exceptionally light. Of the Victorian bookings 140,950 cases are for the German markets,

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of January:—

AUCKLAND.—Large quantities of locally grown fruit are coming forward, for which there is a very fair demand, but few consignments are free from disease. Black-spot appears to be very bad, nearly every case opened being more or less affected. Codlin-moth is also very plentiful. Growers of the affected fruit have been notified that further consignments of infected fruit will be condemned or destroyed. The grading and packing is decidedly a great improvement on last month, but there is still a good opening for growers who will pack only the best fruit, and advertise their methods by labelling their cases. Such growers would eventually get top prices for their fruit, as retailers will not pay good prices for indifferently packed fruit such as has been coming forward. The following list gives a fair idea of the ruling prices for the month: Apples (cooking), per bushel, 3s. 6d. to 5s.; apples (dessert), per bushel, 4s. to 6s. 6d.; pears, per bushel, 4s. 6d. to 7s.; Japanese plums, quarter-case, 1s. to 2s. 6d.; English plums, 2s. 6d. to 4s.; apricots, quarter-case, 4s. to 4s. 6d.; peaches, quarter-case, 2s. 6d. to 5s.; lemons, first quality, case, 12s. 6d. to 16s.; lemons, second quality, case, 8s. to 10s.—*C. Craigie.*

WELLINGTON.—The markets during the month of January were very heavily supplied with practically every line of seasonable fruit and vegetables. Very heavy supplies of stone-fruits came forward. Peaches are coming forward in large quantities almost daily. Formerly they were arriving in very bad order, due to careless packing, but lately they are arriving in tip-top condition. The principal supplies are from Hastings and Motueka. Prices were very low during the beginning of month, realizing 1s. 6d. per half-case, but at present are selling according to quality at from 4s. to 4s. 9d., prime 3s. to 3s. 9d., inferior 1s. 6d. to 2s. 9d., per half-case. Apricots are plentiful and cheap, some consignments arriving bruised and with leaves, stem, and spurs left on the fruit, showing careless picking. The lots arriving in good order and well packed realized good prices, 4s. 9d. to 5s. 6d., others 1s. 9d. to 3s. 6d., per half-case. Cooking-apples (large-green) are in good demand at 5s. to 6s. 6d., others quit at 2s. 6d. to 4s., per bushel case. Several lines of apples which were affected with codlin-moth were destroyed. Nectarines are in good demand, choice lots selling at 4s. 6d. to 5s. 9d. half-case, others 2s. 9d. to 4s. Pears are not in very good demand. It was necessary to destroy several lines on account of their being badly affected with pear-seab, codlin moth, and scale. Prices for dessert, 2s. 6d. to 3s. 6d. per half-case. Greengages are firm at 4s. 6d. to 6s. 6d. half-case. Plums are plentiful, and the demand lately is keen: Choice Burbanks, 2s. to 3s.; others, 1s. 4d. to 1s. 9d.; Blue Diamonds, 2s. 9d. to 3s. 3d.; Early Rivers, 3s. to 4s., per case. The market is well supplied with tomatoes, and the prices have eased slightly, being 4s. to 4s. 6d. per half-case: overripe lots quitted at 3s. to 5s. per case. Grapes are in good demand; some consignments opened up in poor order, due to the long delay in transit from North Auckland. These brought 7d. to 11d. per pound. Local hothouse-grown realized from 1s. to 1s. 5d. per pound. Black currants continue in excellent demand at 6s. 6d. to 8s. 6d. per half-case. The season is almost over. Gooseberries are almost done, and prime ripe offer 6s. to 8s. per half-case. All vegetables are in good demand, and prices vary according to the supply. Vegetable marrows, 5s. to 8s. per sack; cauliflowers, 5s. to 7s. 6d. per sack, choice 7s. 6d. to 9s.; carrots, per sack, 6s. to 8s.; white turnips, 5s. to 6s. 6d. per sack; swedes, 5s. to 6s. per sack; parsnips, 6s. to 7s. per sack; beetroot, 5s. to 6s. 6d. per sack; lettuce, 1s. 6d. to 2s. 9d. per sack; French beans, 2d. to 3d. per pound; broad beans, 2s. 6d. to 3s. 6d. per part sack. Green peas average 8s. to 12s. per sack; potatoes, 7s. 6d. to 10s. 6d. per cwt.; onions, £8 per ton; cabbages, 7s. to 9s. per sack.—*T. C. Webb, jun.*

CHRISTCHURCH.—Fair supplies of stone-fruits from Hawke's Bay, Nelson, Teviot, and Auckland were offering in local markets. Local fruits also in fair quantities. A few lots of tomatoes from the Nelson District were also on sale. Vegetables are not so plentiful as last month. A few lots of Australian grapes were landed in inferior condition. Sufficient care did not appear to have been taken in packing, consequently the fruit opened up bruised and not in suitable condition for first-class sale.—*E. A. Reid.*

DUNEDIN.—Peaches, tomatoes, and plums are coming to hand in good quantities. Raspberries, strawberries, apricots, grapes, red and black currants, and gooseberries are just about over, small quantities only coming to hand. Apples and pears are coming forward in small supplies only. During the month warning notices had to be issued for fruit affected with shot-hole fungus and codlin-moth. Fair supplies of the following vegetables are coming to hand in good condition: Potatoes, cabbages, cauliflowers, carrots, lettuce, marrows, turnips, beetroot, rhubarb, beans, and radishes. All shops are well supplied with most varieties of both local and imported fruits, the same being of good quality and condition.—*E. T. Taylor.*

BLUFF.—Locally grown fruit is now arriving in considerable quantities, the majority being grown in Central Otago. During the month fruit arrived from the following districts: Auckland: Burbank plums—A fair quantity in good order. Hawke's Bay: Plums—Good condition and clean. Canterbury: Tomatoes, apples, pears, and raspberries—Good lines of fruit. Otago Central: Apricots, peaches, plums, apples, pears, and grapes—A fair quantity is arriving almost daily, and is in the best of condition and clean. A good many growers are represented, and good prices are obtainable. Southland: Cherries, raspberries, currants, strawberries, and vegetables—The fruit-shops were inspected, and the auctions inspected weekly.—*R. Hutton.*

HONEY-CROP PROSPECTS.

THE Director of the Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—Honey prospects decidedly good both in quantity and quality.—*G. V. Westbrooke.*

WELLINGTON.—As anticipated, the recent weather has been exceptionally good for honey-gathering, and has resulted in an average crop being secured. The majority of the honey is, as formerly, of an excellent quality.—*F. A. Jacobsen.*

CHRISTCHURCH.—Beekeepers generally have been very busy extracting honey of choice quality during the last two weeks. The hot weather has burnt up clover-bloom, especially on light lands, and indications point to a falling-off of nectar.—*L. Bowman.*

DUNEDIN.—Weather-conditions are at present against a large honey crop. Extracting is in progress; and the returns show a steady increase over last season. Given fine weather there is yet time to secure good returns, as there is an abundance of clover. Honey sent forward is realizing good prices.—*E. A. Earp.*

OUR TRADE WITH VICTORIA.

THE total value of the imports in Victoria from New Zealand for the quarter ending 31st December, 1912, was £186,671. The principal items were—Animals, living, £1,460 (8 geldings, 1 mare, 158 sheep); fish, fresh, potted, and preserved, £7,541; grain, £24,374 (barley 15,010 cwt., oats 46,578, bran and pollard 3,538); bacon and hams, £950; preserved meats, £5,025; potatoes, £8,973 (14,088 cwt.); skins and hides, £8,292 (cattle 4,322, horses 149, sheep 400, rabbits 1,624 lb.); timber, £49,048.

Imports into New Zealand from Victoria—Total for quarter, £159,892. The principal items were—Animals, living, £1,176 (8 cattle, 1 mare, 15 sheep); bark, tanning, £1,092; fruits, dried and preserved, £4,223; fruits, fresh, £3,757; leather, £6,241; manures, £8,815; wine, £4,250; wool, greasy, £2,010.

THE WEATHER.

DISTRICT NOTES FOR JANUARY.

D. C. BATES.

District.

Chiefly from Telegraphic Reports.

- 1, 3. High north-east winds and heavy rain fell on the 1st and 5th, but generally the month was unusually dry, with fair and warm weather ruling. An electrical disturbance was experienced in parts on the 28th. The rainfall was considerably below the average of previous years.
2. The northern portion of this district recorded less than the average rainfall, but in the south the total fall was in excess. Most of the rain fell in the beginning and towards the end of the month. From the 7th to the 25th very little rain fell, and the weather was fair and warm.
4. Rainfall above the average by from 15 to over 50 per cent., particularly heavy rain falling on the 1st. A severe thunderstorm occurred in parts on the 3rd and again on the 28th. The weather on the whole was fine, precipitation taking place mostly at night.
5. Inland in this district precipitation was above the mean by about 25 per cent., but along the coast less than the usual amount was recorded. Weather-conditions were similar to that in districts 1 and 3.
6. The rainfall was slightly in excess of the average of previous years, the greater proportion falling during the first week. The weather was fair and seasonably warm.
- 7, 8. Extremely warm weather was experienced, and the rainfall was under the average by about 50 per cent. A cold snap occurred on the 27th and 28th, and on the morning of the latter day a frost was reported at several stations. Snow fell on the mountain-ranges on the 28th. On the 9th and 27th electrical disturbances were experienced.
- 9, 10. Both these districts recorded a rainfall in excess of the average, the mean percentage above being about 55. The first and last weeks were unsettled, but warm and dry conditions prevailed, with northerly winds, during the remaining portion of the month. On the 14th and between the 18th and 21st high north-west winds were experienced. The heaviest rainfall occurred on the 6th, 21st, and 27th.
- 11, 12. Changeable and showery weather prevailed throughout the month, there being only about nine days on which no rain was recorded to the southward of Westport. Northward, rainy days were not so frequent, although the total fall was usually in excess of the average. The departure from normal greatly varied, but the percentage was generally above by from 10 to over 100 per cent. in the south. From the 18th to the 21st frequent showers of hail were reported.
13. Very heavy rain fell on the 6th, which brought the total for the month in advance of the average fall by from 15 to 40 per cent. Otherwise there were but few wet days, between the 8th and 26th especially being practically rainless. Fine weather predominated.
14. A month of strong north-west winds, frequent gales being experienced. Changeable and showery weather prevailed, but the rainfall was less than the average by about 20 per cent.
15. Fair and warm weather prevailed. The rainfall was 20 per cent. below the mean for January.
16. Fair weather predominated, but showers were frequent, causing a total fall for the month in excess of the average by from 15 to 30 per cent.



19-24. All the east-coast districts recorded above the average rainfall, the excess ranging from 20 to over 100 per cent. in parts. Some very warm weather was experienced, a far station in Canterbury recording over 90 per cent. in the shade on several occasions. Electrical disturbances occurred in scattered areas on the 9th, 10th, and 27th.

25. Though warm, dull and showery weather prevailed, and strong westerly winds were frequent during the month. The rainfall was nearly everywhere above the average.

SUMMARY.

As a rule warm and fair weather was in the ascendant over the Dominion between the 6th and 21st, except in the west coast districts of the South Island, where showery and changeable conditions were experienced throughout the month.

The rainfall was below the average in the Auckland and Hawke's Bay Districts, but elsewhere, owing to several days of good soaking rain, principally on the 6th, 21st, and 27th, the total for the month exceeded the average.

On the night of the 6th the centre of a cyclonic system passed through Cook Strait, and a disturbance of a similar nature but of greater intensity passed in the same vicinity on the 27th. Both these atmospheric disturbances brought beneficial and general rains. Several westerly areas of low pressure passed in the South during the month, and one, on the 14th, was of unusual intensity; but although heavy north-west gales were experienced at this time little rain accompanied it.

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of January:—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
2	Jerseys ..	Heifers ..	London ..	C. Day ..	Tamahere, Wai-kato.
6	" ..	" ..	" ..	R. Glynn Lewis ..	Okoroire.
1	Wire-haired fox-terrier ..	Female ..	" ..	C. L. Thomas ..	Napier.
1	Ditto ..	Male ..	" ..	" ..	" ..
QUAIL ISLAND (LYTTELTON).					
1	Collie ..	Female ..	London ..	James Lilico ..	Lochiel.
3	Collie pups (dropped on voyage) ..	Male ..	" ..	" ..	" ..
1	Holstein ..	Bull ..	Sydney ..	J. B. Reid ..	Elderslie, Oamaru.
1	" ..	Heifer ..	" ..	" ..	Ditto.
SOMES ISLAND (WELLINGTON).					
3	Collie dogs ..	Male ..	Liverpool ..	J. R. Corrigan ..	Hawera.
2	" pups ..	Male and female ..	" ..	" ..	" ..
9	Romney Marsh ..	Rams ..	London ..	J. Telford* ..	Clinton.
2	" ..	" ..	" ..	J. R. McKenzie* ..	" ..
1	" ..	" ..	" ..	A. McKay* ..	" ..
1	Hereford calf ..	Bull ..	" ..	A. C. Levett* ..	Feilding.
1	" ..	" ..	" ..	D. McFarlane* ..	Canterbury.
2	" ..	" ..	" ..	A. Moore† ..	Kai Iwi.

* Messrs. Dalgety and Co., agents.

† Messrs. Murray, Roberts, and Co., agents.

ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the *Journal*, in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question the most complete descriptive details should be furnished.

SHELTER.

"SHELTER," Hobson Bay Road, Parnell, writes as follows:—

Will you please inform me through the columns of your *Journal* what you consider the most suitable trees to plant for shelter on the Hauraki Plains?

The Orchards, Gardens, and Apiaries Division replies as follows:—

The following trees are recommended as very suitable for shelter planting in your district: Black-wattle (*Acacia decurrens*); *Pinus muricata*; *Eucalyptus amygdalina*.

FRUITGROWING.

"SUBSCRIBER," Auckland, writes as follows, under date of the 10th December:—

Would the Department, through the next *Journal*, please give me advice on the following questions:—

(1.) I have some two-year-old peach-trees (Royal George and Briggs' Red May), planted last spring, having been pruned right back to the trunk then, leaving three and four well-placed buds to form a good low framework. The trees have made good growth, and the leaders are now from $2\frac{1}{2}$ ft. to 3 ft. long, and have commenced to throw out numerous laterals. I would like to know if it would be advisable to choose one or two of the best-placed laterals on each leader and encourage them, as I believe by doing so a good-shaped tree could be formed quickly. Perhaps it should be understood that the above method of treatment should be adopted when summer pruning.

(2.) What is the best manure, or other treatment, to encourage vigour in young peach or nectarine trees which have had the leaf-curl and appear to be stunted in consequence?

The Orchards, Gardens, and Apiaries Division replies,—

(1.) In young trees such as those you mention three or four good leaders should suffice. All laterals should be summer pruned, and the leaders cut back at the winter pruning.

(2.) A good manure to encourage vigour in young peach or nectarine trees which appear to be stunted would be 12 oz. superphosphate, 8 oz. bonedust, and 2 oz. sulphate of ammonia for each tree.

BORER.

MR. J. G. FINLAY, Wellington, writes,—

On inspecting my fruit-trees last week I noticed an apple-tree with one of its branches withered. An examination showed me that an insect in the form of a borer had entered the branch, and was working its way towards the top. I should be pleased if you could tell me through the *Journal* the name of this insect and the best way of dealing with it?

The Orchards, Gardens, and Apiaries Division replies,—

The insect described by you is probably the borer *Aenoma hirta*. The simplest method of dealing with this pest is to open with the point of a penknife the tunnel made by the pest, cut off and insert the head of a wax match, and then plug the mouth of the tunnel with a little hard soap.

BARLEY AND VETCHES.

MR. JOHN P. LINEHAN, Rongokokako, writes,—

In the December issue of the *Journal* an article on barley and vetches states that $2\frac{1}{2}$ bushels to the acre were sown. Kindly inform me (1) the proportion of vetches to barley, and (2) the cost of vetches-seed, say, in Wellington or other centre, as they are not stocked here.

The Fields and Experimental Farms Division replies,—

(1.) The proportion of vetches to barley: $1\frac{1}{2}$ bushels vetches to 1 bushel barley. (2.) Vetches cost 11s. 6d. per bushel in large quantities, 12s. 6d. per bushel in small quantities.

DODDER.

MR. E. L. PURDIE, Frankton Junction, writes,—

Will you kindly inform me through your *Journal* the best means of eradicating clover dodder? I have a small paddock of cow-grass in which dodder is killing the clover in several patches of two or three yards in diameter. The dodder is now flowering. Do stock spread the pest?

The Fields and Experimental Farms Division replies,—

When dodder is present in small patches each patch should be cut close to the ground before the clover flowers and the cuttings spread over the patch and allowed to dry. When they are dry they should be burnt. This treatment should be done at least twice during the year. If the whole paddock is dodder-infested it is necessary to plough up before the dodder seeds and resow the following spring. Stock are often the means of spreading the pest.

FERTILIZERS.

MR. L. HEDGES, Pahiataua, writes as follows:—

Would you kindly inform me if there is any loss of chemical action with these manures mixed: (1) Lime and basic slag; (2) bonedust and basic slag; and (3) lime and bonedust?

The Agricultural Chemist replies,—

Ammonia is lost when mixtures 2 and 3 are mixed; No. 1 mixture may be made up without any loss.

FERTILIZERS.

“SUBSCRIBER,” Cambridge, writes as follows:—

Could you inform me through the *Journal* (1) whether slaked ground lime, or burnt lime, should be used in making basic superphosphate; (2) is basic superphosphate a good top-dressing for medium to light lands when used alone; (3) is the autumn a good time to apply basic superphosphate as a top-dressing?

The Agricultural Chemist replies,—

(1.) Slaked lime. (2.) Yes. (3.) Yes.

NEW ZEALAND FLAX (PHORMIUM TENAX).

MR. F. BULL, Waddington, Canterbury, writes,—

Could you tell me the correct distance from the ground at which native New Zealand flax should be cut? I have about 100 acres of land in flax, and have always allowed the flax-cutters to cut it as they pleased, but have recently been informed that if cut down into the butt of the leaf which contains the gum the growth is thrown back about fifteen months.

The Fields and Experimental Farms Division replies,—

The correct distance to cut New Zealand flax is from 6 in. to 8 in. above the bulb; if cut too close into the bulb the plants “bleed,” and the growth is thereby considerably retarded.

WETHER PRODUCING MILK.

MR. P. D. HARGREAVES, Waiwhatawhata, Otorohanga, writes,—

I have at present a crossbred wether running on my property which produces milk exactly similar to a wet ewe. I have never before seen or heard of such a peculiarity, and would be glad if you can account for it, thinking at the same time it might interest some of your readers.

The Live-stock and Meat Division replies,—

This is apparently a very interesting case. In all probability the animal is hermaphrodite. A veterinary officer will examine the animal when in your district.

DIAMOND-BACK MOTH.

T. B. H., Richmond, writes,—

Does the turnip-fly attack chou moellier or thousand-headed kale ?

The Fields and Experimental Farms Division replies,—

The diamond-back moth, which is generally erroneously termed the "turnip-fly," attacks all members of the turnip and cabbage family, including chou moellier and thousand-headed kale. The effects of this moth, however, appear to be less disastrous to the kales than to the turnips and rape.

DRESSING COWS.

MR. HENRY WAKELIN, Kamo, writes as follows:—

In dressing cows for returning to the bull too often (every three weeks), should they be dressed while in season ?

The Live-stock and Meat Division replies,—

No. Wait about two days after oestrus has passed off, then irrigate her. She could then be allowed to go to the bull when next she comes in service.

WARTS ON COWS' TEATS.

MR. R. WECH, Warkworth, writes,—

If there is any known cure for warts on cows' teats, would you kindly let me know, as our cows are badly affected with the complaint. It seems to be very catching.

A reply to "Subscriber." Hastings, on the same subject appeared in the December (1911) *Journal*, but the Live-stock and Meat Division adds the following:—

As your cows are still milking, you might try painting them every night with a solution composed of salicylic acid 2 parts, zinc-chloride 1 part, and collodion 15 parts. Apply with a camel-hair brush. From the frequency with which warts spread, and their closeness of situation, it has been suggested that they may be infective, but this has not been determined.

LAMB TROUBLES.

MR. WILLIAM DODD, Glenham, Southland, writes,—

What is the cause of big joints in lambs ? Is there any cure ? We lose a few every year, and those that live are cripples and never thrive. I blame cold and wet, but may be wrong. The trouble begins when the lambs are about three weeks or a month old, and attacks either ewe or wether lambs, mostly after tailing. This season and last were the worst for the trouble in my experience.

On page 564 of your *Journal* a question is asked regarding still-born and weak lambs. The cause in the case in question was the nine weeks' turnips. From two to four weeks' turnips previous to lambing is sufficient. After that the death-rate will increase in proportion to the length of time the ewes are kept on turnips. Let the ewes have the turnips after lambing.

The Live-stock and Meat Division replies,—

The cause of this condition is not exactly determined. Cold and wet could hardly be the cause, as the condition is found in dry districts and in good seasons. A more probable cause is the entry of micro-organisms through the navel when the animal is a day or two old, this leading to enlargement of one or more joints—the so-called “joint evil.” If you can possibly manage it, change your lambing-paddock next season. There is no telling how long the germs may live on a pasture, and it is as well to take every precaution.

DAIRYING PROBLEMS.

“Ego,” Koromatua, Frankton Junction, writes,—

1. Will you please inform me why cows decrease considerably in milk-yield when fed mostly on clover? Towards the end of November my cows were milking well, but since the clover began to flower they have fallen in yield rapidly.

2. My farm is ordinary fern and scrub country, and was put into grass eighteen months ago after the ploughing. The herbage is mostly clover, which grows in great abundance. I should like to encourage the growth of grasses in preference to clovers. I notice that in the paddock where my young calves are fed (on skim-milk) the grasses thrive admirably. The same thing occurred in another paddock used last year. Could you suggest a reason? It is surely not the ammonia in the dung—the clover land should be rich in nitrogen. I top-dressed with basic slag last autumn: could I improve on it?

3. Is there any difference between “ulceration of the womb” and “septic metritis”? What are the symptoms? If the disease is infectious, why are not the same precautions advised as in the case of abortion? There is much trouble this season in the Waikato through cows discharging sometimes a thick whitish matter, and others a brownish fluid. Could you suggest a reason?

The Fields and Experimental Farms Division replies,—

Clover, under ordinary conditions, does not decrease the milk-yield. There is probably some other cause that has not been observed. It should be remembered that when the clover is flowering the period of lactation is lengthening, consequently there is a decrease. In your district clovers are luxuriant when first laid down. You will in all probability find that after the first season the clover will not predominate.

The paddock in which you keep calves is probably smaller than your other enclosures, and during the season when not occupied with calves it will have been closely stocked. Such paddocks are usually convenient, and on this account they are in constant use. Stock fed in other enclosures are brought in for the night, or horses fed in the stable are put there. This brings about complications, which are exhibited in the altered pasturage. Naturally, the actual cause cannot be defined.

The Live-stock and Meat Division replies,—

Evidently the condition referred to is what is termed “metritis” or inflammation of the womb. Owing to the cause generally being the absorption of decomposing material from this organ into the blood-circulation, the condition is usually called “septic metritis.” It is practically a blood-poisoning, the most common cause being retention of the afterbirth, or part of it, and its decomposition. In other cases, especially where the symptoms are seen two days or so after calving, the probability is that some tear or abrasion, either of the uterus or vagina, has occurred. The symptoms shown are not always the same, and may come on two or three days after calving, or not until a week or more afterwards. You may say there is an acute and subacute form. The usual symptoms in the acute form are that the cow has not cleansed, and is not doing as well as she should be. She may not be eating or ruminating, and may be more than ordinarily thirsty, and the secretion of milk diminished, if not suspended. In some cases locomotion may be interfered with, and she may even be down and cannot be made to rise. These cases are sometimes mistaken for milk-fever. A cow, however, suffering from metritis does not lose consciousness, and does not show brain symptoms, such as allowing the eye to be touched with impunity, which you see in milk-fever. If the animal has not cleansed, the afterbirth is generally in a stinking condition. If she has done so, on passing

your hand into the womb you can generally bring out a quantity of reddish mucous, which smells badly, and probably portions of the afterbirth which have not been expelled. The temperature, as shown by the clinical thermometer, may be higher than normal, or, on the contrary, below, so it is not to be relied on. In these cases treatment should be prompt and active. The first thing to do is to thoroughly flush out the womb with a warm antiseptic solution. As much as possible should be injected, and care should be taken to get as much as possible out again. Lysol, 1 to 80 (two teaspoonfuls to the pint), or Jeyes or Lawes fluids, 1 to 50 (three teaspoonfuls to the pint), can be used to make the solution, which can be repeated every day. A drench composed of Epsom salts 10 oz., powdered carbonate of ammonia $\frac{1}{2}$ oz., powdered ginger $\frac{1}{2}$ oz., and powdered gentian 1 oz. may be given in a quart of thin gruel or milk. The same drench, leaving out the Epsom salts, may be given three times a day afterwards. If the cow is a valuable one, and the case is urgent. I should give her quinine. This drug is, however, expensive. Two drachms dissolved in 2 oz. of sulphuric ether, in milk, may be given every four hours. What may be termed the subacute form may not be noticed for a week or more after calving. The cow may not be doing as well as she should, and be gradually losing condition. A reddish-chocolate discharge may be noticed from the vagina. In these cases the usual irrigation of the womb should be carried out, and the carbonate of ammonia drenches given.

LUCERNE.—COCKSFOOT-SEED.

MR. G. T. EMTAGE, Warkworth, writes,—

I should be glad if you would inform me (1) what is the best variety of lucerne to sow on sand, also what quantity per acre; and (2) how long would it be advisable to keep cocksfoot-seed.

The Fields and Experimental Farms Division replies,—

(1.) The Department has no definite information on a variety of lucerne specially suitable to such conditions. It must be remembered that sandy soils are of decidedly varying descriptions, and you give no details. There is practically no variety of lucerne specially adapted to sandy areas. The departmental *Journal* of October last supplies fairly complete information on lucerne experiments on sandy areas. The usual quantity of seed sown is from 15 lb. to 20 lb. per acre. The smaller quantity is ample if the cultivation is thorough.

(2.) The germination of cocksfoot-seed lessens each year after it is harvested. The conditions under which it is stored determine the deterioration. The recommendation is that if your seed has been kept for more than one year you should yourself test the percentage of its germination. Put a hundred of the doubtful seeds between damp paper or thin flannel and observe the results. The seeding can then be regulated.

EIGHT-WIRE FENCE.—BLACKBERRY-MOTH.

MR. CARL WEAFFER, Northern Wairoa, writes,—

I enclose measurements of a standard seven-wire fence, copied from a southern newspaper. Will you kindly give in the *Journal* the measurements of a standard eight-wire fence.

You do not say where the blackberry-moth is working, or whether any attempt is being made to spread it into other places.

The Fields and Experimental Farms Division replies,—

There is no definite standard. The distances between the wires are regulated by the particular predilection of the owner.

The Biologist replies,—

The blackberry-bud moth (*Carposina adreptella*) appears to be prevalent over most of the South Island and in the North as far as northern Taranaki. No attempts at distribution have yet been made, as it is well to first secure accurate data as to its effectiveness in those districts where it is most prevalent. The results of its work this year have not been so encouraging as that of last season.

COMMERCIAL REPORTS.

BRITISH DAIRY-PRODUCE MARKETS.

THE High Commissioner for New Zealand, reporting on the dairy-produce market, under date of London, 13th December, writes.—

When reporting to you on the 22nd November concerning the market in this country for New Zealand butter and cheese I indicated that, although I was not then hopeful of an immediate recovery in prices, there was one noticeable feature of the butter-market to which attention might be directed: that was that Danish butter had not participated in the decline, but had been firm, and its value had been fully maintained.

Having this in view, and recollecting my statement of the 1st November that the outlook might be described as doubtful and speculative, and that a "bear" effort might be expected, the peculiarity of the butter-market during the past three weeks may to some extent be understood. During the week following my last report the depression in the dairy-produce trade continued, and became somewhat intensified. My quotations for choicest New Zealand butter were 120s. to 116s. per cwt.: at these figures buyers were holding back. Naturally, holders were not desirous of putting fresh arrivals into cold-store to add to the accumulations and to risk deterioration in quality. The result was that further reductions were made in order to induce trade, and as low as 116s. to 114s. was accepted for choicest butter in the week following the despatch of my report to Wellington.

This rapid drop—6s. in a fortnight—especially as there was then a difference in price established between Danish and New Zealand butter of 14s. per cwt., naturally directed attention to shipments from the Dominion. Buyers began to offer more freely to purchase at the reduced values, and holders, taking advantage of the position, fortunately agreed to fight for satisfactory prices and to keep the market firm. This, it will be recollected, is what I indicated in my report of the 1st November would have to be done.

Retailers throughout the country, having been induced by the reduction in price to place New Zealand new-season's butter before their customers, and the quality this season proving satisfactory, found that they must continue to stock it, so that each week shipments have been successfully disposed of at an advance in quotations. The reduced prices taken for the first shipments must therefore be accepted by consignors as satisfactory, in that they have had the effect of inducing a good consumptive demand throughout the country, which must eventually tell, and the preliminary losses sustained should be written off by them as "advertising expenses." The outlook has now greatly improved, and it is to be hoped that the high prices again ruling may be continued after Christmas and well into the New Year.

Cheese, while now showing slightly more firmness, has not advanced in price as butter has done. There are many who are of opinion that when New Zealand shipments become heavier, as they are expected to do after Christmas, all that can be hoped for is that present values may be maintained. First-grade New Zealand cheese is now realizing from 60s. to 62s. per cwt. for white and 61s. to 63s. for coloured, according to quality.

First-grade New Zealand butter is now fetching from 118s. to 126s. per cwt., according to quality, the former price being accepted for lots of very ordinary quality, and the latter being paid for a few choice brands. It will have been noticed that so far this season, in cabling weekly quotations, commencing with the arrival of the s.s. "Turakina" shipment, which was the first of the new season, I have given a range of prices for butter of several shillings. This I have done, as it was found impossible in the unsettled, fluctuating state of the market to give a reliable average price that would be acceptable. The custom in former years has been to give the average price of choicest quality only, and this practice I shall recommence when I find the settlement of the market warrants it.

SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton. Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow. Bales.	Kauri- gum, Cases.	Sundry.
January, 1913	166,714	229,179	6,886	109,251	63,864	118,986	..	329	..	6,969	2,215	4,110	6,611 carcasses pork.
1912	237,284	302,399	12,424	114,512	64,005	95,994	..	..	7,295	6,365	1,942	3,407	59
February, 1912	208,424	273,246	13,052	101,544	62,398	106,074	607	..	..	6,831	1,615	1,056	..
1911	242,090	450,406	24,924	86,368	46,667	70,030	23,694	200	..	4,428	1,302	2,113	1,369 carcasses pork.
March, 1912	324,192	518,402	20,201	84,925	49,308	70,022	..	4,980	..	3,832	1,352	2,644	16 carcasses pork.
1911	264,297	665,822	26,657	45,912	40,668	58,362	40,276	..	..	3,650	1,583	8,982	2,408
April, 1912	213,178	355,829	7,046	38,986	38,137	31,615	4,905	2,180	..	5,134	1,958	4,458	..
1911	172,563	491,413	19,106	14,823	33,411	42,917	38,456	6	..	9,233	1,827	2,577	2,431 carcasses pork.
May, 1912	454,506	744,287	32,691	1,441	40,535	51,833	11,157	26,569	1,500	11,963	2,826	6,287	..
1911	204,390	377,105	20,173	995	20,732	33,033	93,854	..	..	7,443	1,210	7,720	1,087 carcasses pork.
June, 1912	170,738	287,697	24,605	558	7,712	18,138	9,160	7,622	2,039	5,646	1,168	1,213	221 carcasses pork.
1911	214,079	448,432	15,789	..	6,323	19,568	39,422	..	14,128	4,763	525	5,528	2,434
July, 1912	291,097	371,474	29,457	684	1,255	16,567	44,324	23,216	20,573	7,463	1,856	5,892	210 carcasses pork.
1911	206,869	260,761	14,296	..	276	14,100	29,452	..	10,334	6,022	1,073	2,786	175
August, 1912	207,239	157,580	10,478	559	..	10,409	42,580	38,802	19,562	3,758	523	4,219	203 carcasses pork.
1911	66,608	110,054	3,653	..	..	5,260	31,976	..	18,231	3,443	303	3,475	..
September, 1912	44,657	40,759	1,174	8,723	1,204	6,671	15,742	17,363	19,933	2,957	501	3,671	220 carcasses pork.
1911	102,081	40,057	6,059	6,404	..	7,390	38,151	..	33,059	5,604	393	7,672	..
October, 1912	51,263	15,393	3,882	49,962	16,389	4,647	7,952	64,480	5,396	4,193	401	9,075	..
1911	9,417	2,043	100	49,626	11,501	2,182	..	..	32,094	4,514	754	2,982	..
November, 1912	54,175	8,286	282	140,751	57,181	33,305	3,680	40,896	13,892	9,866	1,911	5,466	..
1911	47,770	10,427	403	135,741	57,319	44,924	15,833	..	16,606	7,844	2,183	3,085	..
December, 1912	117,740	106,310	4,774	119,885	66,213	44,789	5,868	30,490	10,070	3,816	2,613	3,686	..
1911	72,192	91,965	765	109,397	46,883	54,297	..	..	4,366	5,719	1,364	2,708	..

HEMP AND TOW GRADING RETURNS.

JANUARY, 1913.

Hemp.—The total number of bales graded was 12,716, as compared with 7,643 for the corresponding month of last year, an increase of 5,073 bales. For the twelve months ending 31st January, 1913, the number of bales graded was 105,541, as compared with 85,217 for the previous twelve months, the increase being 20,324 bales.

Tow.—During the month 4,844 bales were dealt with, as compared with 2,355 for the corresponding month of last year, an increase of 2,509 bales. For the twelve months ending 31st January, 1913, the number of bales graded was 34,199, as compared with 23,974 for the previous twelve months, the increase being 10,225 bales.

HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF JANUARY, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	488	1,578	625	8	86	2,785
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	..	1,021	2,579	200	15	2	3,817
Wellington ..	..	11	2,165	1,643	36	2	..	3,857
Blenheim ..	..	41	105	..	..	..	..	146
Picton ..	..	146	28	150	..	..	..	324
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	56	114	284	..	..	1	455
Bluff ..	..	..	117	1,215	..	..	..	1,332
Totals ..	..	254	4,038	7,449	861	25	89	12,716
Percentages of totals	..	2.0	31.78	58.63	6.78	0.11	0.7	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	391	764	142	1,297
Napier ..	..	..	..	..	..
Foxton ..	85	544	326	..	955
Wellington ..	215	1,161	287	23	1,686
Blenheim ..	29	10	..	..	39
Picton ..	23	45	109	..	177
Lyttelton ..	35	..	..	..	35
Dunedin ..	..	51	69	..	120
Bluff ..	..	205	313	17	535
Totals ..	387	2,407	1,868	182	4,844

Stripper-slips.—Passed for shipment: Auckland, 29; Foxton, 371; Wellington, 496; Picton, 14; Dunedin, 9; Bluff, 98: total, 1,017. Condemned: Auckland, 48; Foxton, 6; Wellington, 21; Dunedin, 1; Bluff, 3: total, 79.

STOCK EXPORTED.

JANUARY, 1913.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.		Sheep.			Swine.	
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To Australia.	To Pacific Islands.	To South America.	To Argentine.	To Pacific Islands.
Auckland	7	21	..	..	10	..	507	..	..	43
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	1	..	..	..	..	28*	..	..	..	..
Wellington	33	..	..	..	..	..	..	10*	..	..
Lyttelton	11	..	..	..	..	10†	..	20*	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	1	..	..	..	..	..	..	..	..	..
Bluff	..	..	..	..	..	..	..	10*	..	..
Totals	53	21	..	..	10	38	507	40	..	43

* Rams. † Ewes.

The following are the particulars of the horses shipped : 2 thoroughbred stallions, 13 thoroughbred mares, 7 thoroughbred geldings, 7 light harness mares, 13 draught stallions, 29 draught mares, and 3 pony mares.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of January, 1913, of agricultural and farm products :—

Item.	Quantity.	Value.
		£
Bran	Nil	..
Butter	Nil	..
Cheese	2 cwt.	9
Chaff	3 tons	28
Fruits, fresh, all kinds	1,999,297 lb.	14,158
Barley	Nil	..
Oats	18 centals	12
Wheat	4 centals	4
Onions	5,455 cwt.	1,800
Pollard and sharps	Nil	..
Potatoes	8 tons	73
Seeds, grass and clover	10,181 cwt.	38,085
Total values imported	..	£54,169

NEW ZEALAND - VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since August last:—

	"Zealandia," 30th Aug.	"Marama," 27th Sept.	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.
Butter, boxes ..	2,717	4,428	9,777	5,945	11,377	10,960
Eggs, " ..	..	8	226	..	..	..
Beef, quarters ..	..	..	..	..	580	716
Veal, carcasses ..	..	..	..	..	393	276
Frozen sundries, packages ..	8	..	12	5	12	..
Wool, bales ..	..	..	..	6	20	30
Grass-seeds, beans, &c., sacks ..	..	..	50	177	..	..
Hides and skins, sacks, &c. ..	454	657	721	559	595	329
Onions, cases ..	3	..	..	..	..	14
Sheep-skins, bales ..	..	..	138	..	..	24
Jam, cases ..	50	..	125	100	50	50
Sundries, packages ..	90	5	21	329	92	313
Potatoes, crates ..	21	..	23	..	165	20
Kauri-gum, packages ..	72	69	46	53	21	..
Hemp, bales ..	..	..	..	..	..	246

The "Aorangi," which left the Dominion for San Francisco on the 3rd January, carried the following produce: Grain, &c., 343 sacks; meats, 523 cases; onions, 6 sacks; potatoes, 11 sacks; sundries, 948 packages; butter, 5,894 boxes; hemp, 173 bales.

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Sheep at Pasture, Wairarapa Experimental Farm.]



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PRICE,
SIXPENCE.

OX-EYE DAISY.

A. H. COCKAYNE.

OX-EYE daisy (*Chrysanthemum leucanthemum*) is widely distributed throughout New Zealand, and is often extremely prevalent in permanent pastures. Under certain conditions it appears, if left unchecked, to be able to obtain almost complete possession of the ground, and thus very seriously affect the carrying and money-earning capacity of the land. Like most weeds, however, its seriousness depends very largely on the purpose to which the land is devoted. In certain phases of agriculture it takes its place as one of our most pernicious weeds, while in other cases its presence may have but little economic importance.

The relative damage that weeds cause under different conditions is a most important matter for investigation, as on it depends to a very large extent the necessity for sustained efforts to avoid their introduction into certain types of land and for carrying out adequate control measures when once they have become established. Thus fat-hen in land that is

used for annually sown spring crops is an exceedingly bad weed, but the use of alsike containing fat-hen-seed in autumn-sown permanent-pasture mixtures will have very little, if any, deleterious effect on the future value of the pasture. One of the most important facts with regard to ox-eye daisy is that it is readily eaten by sheep and is almost always rejected by cattle even when feed is extremely scarce, and it is on the single point whether the land is to be utilized for sheep or cattle that will determine whether or not the sowing of small quantities of ox-eye as an impurity in the seed used will cause any appreciable harm.

EFFECT ON LAND USED FOR ALTERNATE CROPPING.

On land used for alternate cropping, and where the pastures are all of a temporary character, ox-eye daisy can never be looked upon as a serious weed. It is quite a shallow rooter, and the plants themselves are completely killed by ploughing. Of course, where it has been allowed to seed a good many new plants are liable to come up, but as on this type of country there is not a very long interval before the ground is broken up again the plants do not become sufficiently aggressive to cause much material harm. It would, however, be a good practice to graze sheep during the summer on any grass land containing ox-eye daisy that is to be broken up the following autumn. In this way the flowering and consequent production of seed will be reduced to a minimum. The same result may be secured by taking a hay crop off the land, followed by stocking with sheep. If the hay is cut very early in the season the ox-eye may frequently flower before the end of the summer, but the sheep will prevent any second flowering occurring.

EFFECT ON LAND USED FOR DAIRYING.

On dairying-land ox-eye daisy is a really serious weed, inasmuch as cattle will not touch it, and in eating down the other constituents of the pasture they improve the conditions for the ox-eye to spread, both by an increase in area occupied by the individual plants and the development of large quantities of seed. In time the carrying and money-earning capacity of the land for dairying is seriously interfered with. Under such circumstances, unless the ground can be profitably ploughed up and sown with a mixture containing a good proportion of clovers, heavy stocking with sheep will be the only remedy to adopt. In dairying-paddocks that are understocked the ox-eye is not nearly so likely to assume control, as the competition between it and the other constituents is much more evenly balanced than when the grass is eaten bare and the ox-eye left. Whenever ox-eye appears on dairying land sheep should be used to feed it down, and if this is done before the



Ox-EYE DAISY.

From Leaflet No. 28, by T. W. Kirk.

weed has got too strong a hold any danger of its spreading will be eliminated. A very good example of the value of sheep for controlling the spread of ox-eye has been shown at the Weraroa Experimental Farm, where some time ago this weed threatened to become serious. Judicious grazing with sheep has, however, virtually eliminated this weed from the farm. On dairying-land where ox-eye daisy has been allowed to get the upper hand fairly heavy stocking with sheep will be necessary to control it, and this will lead to a considerable diminution in the feed available for the cows. In such cases it will be necessary to make extra provision for the production of forage to supplement the pastures. In this connection lucerne should play a very important part and provide a cheap fodder. By this means the control of the weed can be accomplished without interfering to any serious extent with the dairying side of the farming operations.

EFFECT ON SHEEP COUNTRY.

On sheep-country ox-eye daisy is rarely prevalent. Theoretically it should never be a troublesome weed on such land. In the 1895 report of this Department Kirk writes, "Heavy stocking with sheep will completely eliminate this weed." This is perfectly true, but it is not always practicable to stock sufficiently heavily. This is especially the case where the areas are large and are not sufficiently subdivided to enable the stocking to be properly controlled. In small sheep-paddocks ox-eye should never become in any way a serious weed. It is always desirable to maintain a certain number of sheep on a dairy farm. Their utility is in closely grazing the pastures in order to obtain an even growth, by eating down by the sheep of the patches rejected by the cattle. This implies, however, small paddocks, for the stocking by sheep must be heavy to be effective. The same thing really applies to sheep-country proper, where it is desired to reduce to a minimum those weeds which will be eaten by sheep under compulsion.

AGRICULTURAL SEEDS LIKELY TO CONTAIN OX-EYE DAISY.

Ox-eye daisy is very frequently introduced into new localities through the medium of impure seed. It is liable to be present in many kinds of agricultural seeds. The following is a list of those in which it has been found in samples that have been examined: (1) White clover; (2) alsike; (3) birdsfoot trefoil; (4) Boyd's clover; (5) crested dogtail; (6) meadow fescue; (7) timothy; (8) meadow foxtail; (9) yarrow.

In only a single sample of meadow foxtail has ox-eye-daisy seed been found, and as this grass is almost invariably harvested long before the ox-eye seed matures there is only a remote chance of this grass-seed ever containing any seed of the weed. When ox-eye is present in the

clovers it is a very good indication that the seed has been badly cleaned, as this weed-seed is easily dressed out. Seed-merchants having lines of clovers containing ox-eye daisy should always have them recleaned before placing them on the market. The same applies to meadow fescue. With regard to crested dogstail, very little ox-eye is ever found in New-Zealand-grown seed, but that of European origin frequently contains quite appreciable quantities. For this reason alone it is far preferable to use local seed, apart from the fact that its germination is often much superior to that imported. In timothy ox-eye is a frequent impurity, and it appears extremely difficult to dress it out satisfactorily. The larger ox-eye seeds are fairly easy to remove, but a percentage of the smaller ones invariably remain in the line even after it has been carefully recleaned. About 15 per cent. of the timothy examined has been found to contain ox-eye, often in quite small amounts, but at times lines containing 2 or more per cent. by numbers have been received for analysis. Farmers and seed-merchants are urged to take great care when buying timothy-seed to ascertain whether or not it is quite free from this impurity. Yarrow frequently contains large amounts of ox-eye-daisy seed. In one instance no less than 21 per cent. of the sample consisted of this weed. Yarrow is, however, rarely used in New Zealand, and where it is used, except in the case of lawn mixtures, there is little danger of the weed becoming a nuisance, as the conditions under which it is used are not favourable for the spread of ox-eye.

Ox-eye-daisy seed is very distinct from any other seed impurity, and when once known can be easily recognized. However, when ox-eye is present in timothy care has to be taken to carefully look through the sample, as in colour the two seeds closely resemble each other, and it is liable to be overlooked by a mere superficial examination. In localities where ox-eye is abundant the mere sowing of pure seed will be no guarantee that none of the weed will appear, as it can apparently be blown considerable distances. No doubt travelling stock may aid in its distribution. I know that whenever ox-eye appears on newly grassed land the seed sown is invariably blamed, but a proper examination of the seed before sowing will always show whether or not ox-eye is present.

USING SEED CONTAINING A TRACE OF OX-EYE DAISY.

It is, of course, always preferable to use seed that is quite free from any ox-eye daisy, but the question arises whether it is always imperative to reject seed that contains only a trace of this impurity. A case in point has recently come under my notice. The seed contained approximately three seeds of ox-eye per pound, or one seed to every 170,000 seeds of the mixture. This quantity is so small that in European practice it would be deemed to be ox-eye-daisy-free. It is naturally

difficult to decide whether such a small trace should be sufficient to condemn the line. I think a good deal would depend on what soil and for what purpose the seed was to be used. If used on land that is to be afterwards cropped there is no reason why such seed should not be sown. Again, if for sheep-country, there does not appear to be any need to reject such a line. If the seed is to be used on dairying-country it would probably be quite justifiable to reject such seed, but even in this case, if it is known by the farmer to contain small quan-



OX-EYE-DAISY SEED, MAGNIFIED FIFTEEN TIMES.

ties of ox-eye, measures can be taken to efficiently control the weed before it in any way gets out of hand. It seems advisable to recommend that such seed should only be utilized on poor sheep-country where there is little chance of the weed ever becoming serious even if nothing is done to try and suppress it. However, it has been said that timothy is the most likely to contain ox-eye, and it is dubious whether this grass is a profitable one to employ on any purely sheep-country, as it is generally rapidly eaten out and killed after the first season.

Agriculture is an art that renders those who understand it rich, but leaves those who do not understand it, however much they labour, to live in poverty.—*Xenophon*.

The most recent development in agricultural advancement in the United States is the proposal in the State of Washington to create a "Bureau of Farm-development," or the appointment of a trained agricultural expert in each county of the State. The duty of this expert will be to personally advise farmers and direct farm experiments. He will be under the control of a Board of County Commissioners. The Chairman of this Board will be the Director of the State Agricultural College, and the members will serve without salary. Other States are moving in a similar direction.

FAT LAMBS AT RUAKURA.

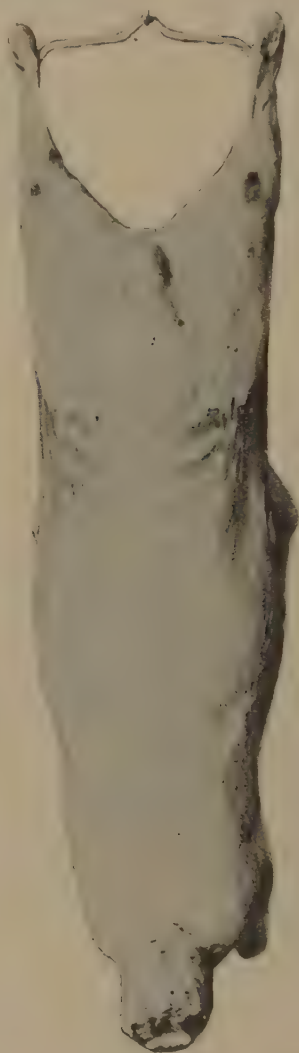
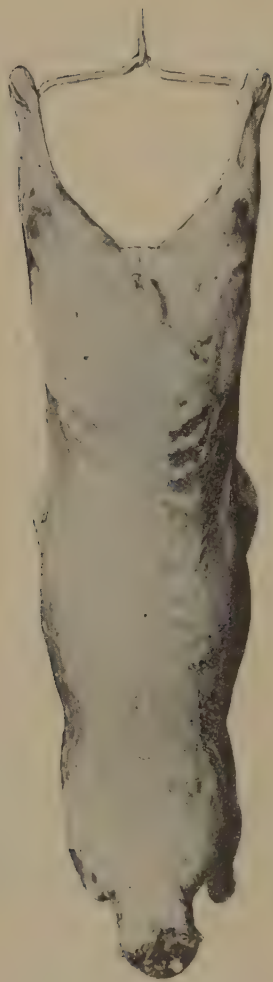
THE SEASON'S EXPERIMENTS.

PRIMROSE MCCONNELL.

ON the 1st February, 1912, 600 Lincoln Romney full-mouthed ewes were put to the rams, half to the Border Leicesters, and half to the Southdowns, at the rate of fifty ewes per ram. Until within a week of lambing the ewes had no feed except pasture-grass. After the rams were removed the ewes were kept in one mob, and were constantly removed from paddock to paddock, and this, I believe, was the secret of their fine condition when the lambing season commenced. From a week previous to lambing until there was a full bite of grass they received a full ration of mangels, which were carted to the paddocks daily, and this was the means of keeping up a good flow of milk—the lambs benefiting accordingly. At the end of November an early paddock of rape was available, on to which at that date the earlier of the unsold lambs were drafted, a second paddock being available when the first was eaten off. With the exception of the last draft of 126, all were sold to local butchers, the said draft being the only one of which the weights of each cross could be compared. The average net price per lamb was 14s., the highest price being 17s. 6d.

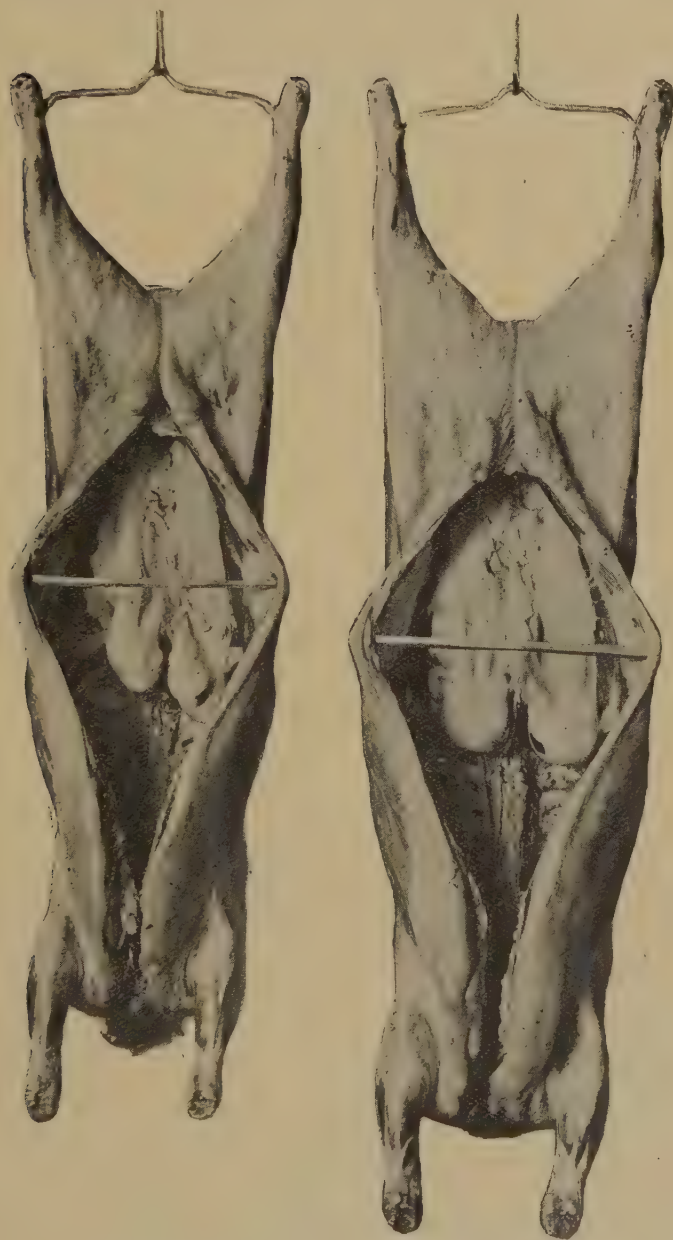
The two lambs shown in the accompanying pictures were selected as two of the best from the last draft, and three weeks previous to their being slaughtered were rejected as not being quite finished. They were dressed and weighed by Mr. Jamieson, butcher, Hamilton. The live fasted weights were—Border Leicester cross, 98 lb.; Southdown cross, 78 lb. The dressed weights were—Border Leicester cross, 64 lb.; Southdown cross, 48 lb. The average weight of the last draft of 120 was—Border Leicester cross, 39.09 lb.; Southdown cross, 37.50 lb.; and all were classed as “very prime.” Every lamb was fat by the end of January, and not a single cull is left on hand.

Five hundred of the ewes that had suckled lambs were sold on the 4th January, 1913, at 6d. per head more than the buying-in price, which would more than make up for the loss through deaths. Judging from the weights of the last draft, and from information received from butchers who killed previous drafts, the Border Leicester



SOUTHDOWN CROSSBRED LAMB
AND DRESSED CARCASE.

BORDER LEICESTER CROSSBRED LAMB
AND DRESSED CARCASE.



Southdown.

Border Leicester. "

THE DRESSED CARCASSES.

cross lambs would average fully 3 lb. per head more than the Southdown cross; and as long as export buyers do not take quality into consideration the value of weight must be recognized, although for quality of carcase the Southdown cross has no superior. The photos are not meant to demonstrate average carcasses; they are intended merely to illustrate the type of the two crosses, alive and slaughtered.

The following table gives results:—

BORDER LEICESTER CROSS.

Dates of Drafts.				Number.	Net Amount realized at the Average of 14s.		
					£	s.	d.
October ..	..	..	..	33	23	2	0
November ..	..	..	..	149	104	6	0
December ..	..	..	..	75	52	10	0
January ..	..	..	..	51	35	14	0
Totals ..	..	..	..	308	£215	12	0

Realized for ewes' wool ..	..	..	..	£112	0	0
Gross profit realized from 300 ewes ..	..	..	..	£327	12	0
Gross profit per ewe ..	..	..	..	£1	1	10

SOUTHDOWN CROSS.

Dates of Drafts.				Number.	Net Amount realized at the Average of 14s.		
					£	s.	d.
October ..	..	..	..	45	31	10	0
November ..	..	..	..	174	121	16	0
December ..	..	..	..	65	45	10	0
January ..	..	..	..	88	61	12	0
Totals ..	..	..	..	372	£260	8	0

Realized for ewes' wool ..	..	..	..	£112	0	0
Gross profit realized from 300 ewes ..	..	..	..	£372	8	0
Gross profit per ewe ..	..	..	..	£1	4	10

Total gross profit, £700.

Although the results of the above table are decidedly in favour of the Southdown cross, yet had all the lambs been sold by weight the two crosses would have shown about similar results. In the matter of quality the Southdown carcase is much superior to that of the Border Leicester, there being no waste fat as in the case of the

latter. The Down also comes much earlier to maturity, although the experiment under discussion does not emphasize this so much as repeated experiments carried out at the Moumahaki Farm. Where it is not possible to fatten all the lambs I am of the opinion that the Border Leicester is the better cross, as it yields a good fleece and a heavy carcase later on; but for the purely early fat-lamb trade the Southdown is unsurpassed. Taking into consideration the fact that this is anything but good sheep-country, the results as shown above must be considered very satisfactory. During the season several first and second prizes were gained at the Waikato and Auckland shows for fat lambs.

It will be noticed that by the end of November 219 Southdown and 182 Border Leicester cross, or nearly two-thirds of the total number, were off hands, which result is undoubtedly due to the fact that sufficient feed in the form of mangels and rape was available at a critical season and was the means of keeping the lambs in a continually thriving condition. Where the ewe flock is renewed each year the advantage of early maturity cannot be overestimated—the risk of having the lambs left on hand as stores is avoided, the ewes being fat early in the season command a higher price, and, the land being freed, there is abundance of feed for the new ewe flock. To obtain the best results the ewes should be in good thriving condition before they are mated.

This season 800 crossbred ewes have been put to the rams, half to the Southdown and half to the Border Leicester.

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VEGETABLE HUMUS.—An interesting experiment is in progress at the Moumahaki Experimental Farm to test the plant-food value of different crops ploughed in as green manure. The field where the trial is being made carried an oat crop in the 1911–12 season. The stubble was disced, and the area, 15 acres, was apportioned out into four plots. On these, mustard, rape, buckwheat, and vetches were grown. It had been intended to plough in the whole of the four crops, but they made such vigorous growth, and the farm at the time was so heavily stocked, that the crops were partially eaten down. The remaining growth, of about 18 in. in height, was ploughed in, the whole area being then sown with ryecorn. In early spring this provided abundant feeding for ewes and lambs, and, being a crop that quickly recovers after grazing, a growth of about 2 ft. in height was soon made. This was ploughed in. The field was then sown in swedes, the seed being drilled. Careful note is being taken of the appearance of the crop on the different plots, and the rate of growth. It may appear that the ploughing-in of the ryecorn would to some extent nullify the test as to the respective merits of the first-ploughed-in crops, but it has to be remembered that the latter had ample time to decompose and be converted into plant-food, whereas the ryecorn was not sufficiently long in the ground to have any immediate appreciable effect.

ELECTRICITY:

ITS POTENTIALITIES IN RURAL ECONOMY.

C. J. DREWITT.

OF the benefits which science and mechanical invention have conferred on the modern farmer, it is now being realized that electricity will be the principal means of revolutionizing country life and work, and thereby bringing about such an amelioration of farming conditions that the rural exodus will cease to be a national danger.

The more the great question of maintenance of soil-fertility is studied—it is the dominant problem in the world to-day—the more the need is realized of thorough cultivation; not only the constant stirring and aeration of soils long in use, but the repeated working of swamp lands (following drainage) and intractable soils. This implies labour—or, rather, a simplified, effective, and economical power. This electricity promises to provide. In the coming days of intensive farming, when fewer but more profitable stock will be kept on smaller but better-worked areas, electricity will become a dominant factor in farming operations; and in no country should this truth become better exemplified than in New Zealand, with its many sources of potential water-power.

In the tilling of the soil electricity promises to play its most important part. With a good supply of current passing through a district from harnessed water-power it would be possible—indeed, the principle is already in operation in England—to have a main line running through farms near the supply route, with every pole (or post) carrying the wire a power-point. With 500 yards of armoured trailing cable attachable with ease between one of these many points and the electrically driven implements, the cheapest and best of all forces for cultivating and other farm operations will be at the farmer's command.

With power delivered under this system compared with the petrol-driven or steam tractor there is a vast difference. In the former case the capacity is very much extended. When the electrically driven implement gets into a soft place, or encounters an obstacle demanding exceptional force to overcome it, the series or three-phase motor will proceed, though, of course, at a slower pace, but it will operate; while with the petrol or steam tractor there is a limit beyond which one

cannot go. In other words, the motor-plough, or implement driven from a wire-conducted current, has a great reserve of force behind it, and is thus capable of work a self-contained motor can never accomplish. More than this, the farmer would only pay for the power he actually used. In light land, and an easy draught, the cost would be less than where stiff land was being worked and the draught heavy.

Electricity presents other possibilities in tilling the soil. Though our power of operation has increased, the plough itself has advanced little in design, and practically nothing in principle, since the sower went forth to sow. We still just turn over the soil and leave it in bulk, other operations being necessary to break it up freely and aerate the seed-bed. That this system still maintains is, in the writer's opinion, solely because of the absence of a power of the required flexibility. This difficulty disappears before the electric motor. If hard steam-coal can be reduced to a fine dust by a rotary-bar electric cutter, it is idle to suggest that tilled land cannot be dealt with in the same manner. The idea is that a rotary disc with transverse blades, set at an angle, should revolve at a high speed, each blade taking a fine cut of soil, which would be elevated and dropped to the side by the setting angle. With a 50 to 70 horse-power motor a sowing of lucerne could be made in one operation, the inoculated soil being spread from the front and thoroughly mixed in the breaking operation, the seed being sown and rolled in behind, there being no objection to small subsidiary motors for the spreading operations. The effect on weeds of such a system can easily be imagined, while a green crop ordinarily ploughed under would be thoroughly disintegrated and mixed with the soil.

Again, on the dairy farm electricity can be used to supply energy for milking-machines, for separators, for pumping water, and for sterilizing utensils, the passage of a current of electricity being one of the most powerful sterilizing agents known. There would be an entire absence of the taint of kerosene from the engine, and of noise, soot, and dirt inseparable from the boiler which now supplies the hot water.

The poultry-yard would be invaded. The present-day incubator, for instance, is still in its initial stage. The incubator of the future will probably be a slowly revolving wheel in the vertical plane, while electricity will supply a perfectly even heat, which could be increased or decreased by the snapping of a switch. The passage of a small quantity of electricity would evaporate the required amount of moisture, while the eggs, by passing a regulated space, would automatically be cooled in succession. The cost of incubating 1,000 eggs, at 1d. per unit, would work out at about 4s., which would be saved many times over in labour.

In the orchard the value of an electric spray to control pests has yet to be determined. This suggests a rich field for experiment, while the beneficial effect upon growth would be undoubted. Again, a system of light-resistance wires run at intervals would ensure against frost.

The possibilities in electricity on the farm are, it will be seen, undoubted, and now that the Ruakura Farm of Instruction has a complete electric installation an excellent opportunity is afforded for experimenting in the directions indicated. The lighting-wires run through a considerable portion of the property. These could be disconnected from their ordinary duty at a pressure of 220 volts and connected to 600-volt wires, and thus be made to supply 30 horse-power from an outside source without difficulty at any pole. Duplicate the wires and that portion of the farm is already equipped to carry a power-supply of the required 50 to 70 horse-power. The lighting of Ruakura by means of electricity is a matter for congratulation. It was particularly desirable from a safety viewpoint. In valuable buildings with a number of youthful inmates candles, oil-lamps, and matches are undesirable. Then, no better place for the development of electricity as a power as well as a lighting medium could be desired. If all the available power from the Waikato River were utilized, as it one day must be, the district from a productive standpoint would be revolutionized. As one stands on the bridge at Cambridge and attempts to realize the amount of money spent on coal and petroleum for power, while thousands of horse-power roll down unused to the sea, the potentialities of the district under electricity made available to the farmer—considering the greater economy of production combined with the increased productivity thereby made possible—are seen to be almost illimitable.

The establishment of a series of about twelve demonstration farms has been authorized in Kentucky. These will be about 20 acres each. The State University and Agricultural Experiment Station have made arrangements whereby four of these farms, all located in the western part of the State, will be donated to the nation.—*Spokesman Review*.

FOOD PRODUCTS FROM BANANAS.—In a recent issue of the American Consular and Trade Reports, Consul Dreher, of Port Antonio, Jamaica, gives some interesting particulars regarding the manufacture of food products from bananas on that island. Mr. Dreher states that this industry, which has been established for not more than six years, is rapidly assuming importance, and that a number of factories are being erected to supply the increasing demand. So far, most of the product has been shipped to England, France, Germany, and Austria, and in those countries the demand is steadily increasing, but numerous letters of inquiry recently received indicate a growing interest in the United States.

THE RED POLL.

A BREED WITH POTENTIALITIES.

THE Red Poll, or Norfolk or Suffolk Poll as they were formerly termed, are one of the most interesting races of British cattle. Opinion is divided as to their origin and antiquity. By some the breed is regarded as indigenous to the district it now occupies in England, where the Suffolk Polls, or Duns, have existed from time immemorial. One writer has traced the breed from the time of the Norman invasion, while others believe that it sprang from Galloway Poll cattle introduced in the eighteenth century, probably soon after the Union of England and Scotland, when numbers of cattle were driven every year from Galloway and elsewhere from the south of Scotland into Norfolk and other parts of England. Again, a Norfolk authority—while admitting the probability of the Galloway Polls in the main being their progenitors—claims part of the credit of the breed's origin for an old native race which existed previously in East Anglia. This much, however, is certain: that the Red Polls are improved editions of a breed known to early writers for their deep-milking qualities, while being credited at the same time with a capacity to furnish, under good feeding, excellent-quality beef. Red Poll cattle have in the past been more remarkable for their milking than for their beef qualities, and at the present time there are individual Red Poll cows of such a distinct dairy type that the possibility of making these cattle highly profitable milking-stock by breeding according to a pedigree of performance is most encouraging. It is impossible to supply definite information as to their milking-capacity, owing to very few herds having been systematically tested. But many cows are credited with giving annual yields of 10,000 lb. of milk, testing in the neighbourhood of 4 per cent. of butter-fat.

At the last London Dairy Show the winning Red Poll cow gave, under the adverse show-yard conditions, 136 lb. of milk in two days, the fat-percentage ranging from 2.72 to 3.34. The second-prize winner gave 96 lb. in the forty-eight hours, the test ranging from 4.40 to 3.87 per cent.

The thirty-five cows in the Tring Park herd of Lord Rothschild gave in one year a milk-yield of 249,078 lb., an average of 7,116 lb. The fat-percentage is not furnished.

A herd on a Government Victorian farm gave the following yields last season :—

Cow.	Weeks in Milk.	Milk, in Gallons.	Butter-fat.	Value.
<i>Season 1910-11.</i>				
			lb.	£ s. d.
Vuelta	38 $\frac{1}{2}$	556.5	405.1	17 10 10
Connecticut	40 $\frac{1}{2}$	818.2	269.0	11 17 4
Bullion	40 $\frac{1}{2}$	773.3	356.7	15 17 10
Beulah	39 $\frac{3}{4}$	646.5	342.6	15 3 6
Cuba	40 $\frac{1}{2}$	526.9	231.8	10 5 11
Cigarette	34	504.4	211.6	8 18 9
Sumatra	41 $\frac{1}{4}$ *	43.6	19.6	0 19 2
Kentucky	36 $\frac{1}{2}$	531.1	225.9	9 12 7
Muria	40 $\frac{1}{2}$	548.9	240.7	9 14 9
Pennsylvania	38 $\frac{1}{2}$	461.9	189.7	8 4 3
Carolina	40 $\frac{1}{2}$	570.5	253.1	11 3 4
Virginia	40 $\frac{1}{2}$	636.2	254.7	11 5 1
Havana	40 $\frac{1}{2}$	575.5	229.9	10 5 0

Season 1911-12.

Vuelta	41 $\frac{1}{4}$	775.2	485.1	26 5 9
Connecticut	40 $\frac{1}{2}$	678.2	364.0	19 11 10
Bullion	43 $\frac{1}{2}$	694.8	344.0	18 10 7
Beulah		(Not completed.)		
Cuba	43 $\frac{1}{2}$	701.4	337.8	18 10 4
Cigarette	41 $\frac{1}{2}$	648.1	285.9	15 14 6
Sumatra	42	666.2	284.2	15 6 2
Kentucky	39 $\frac{1}{2}$	669.5	277.7	15 1 1
Muria	41	580.2	275.7	14 14 10
Pennsylvania	45 $\frac{1}{2}$	634.8	271.9	14 13 10
Carolina	32 $\frac{1}{4}$	580.6	254.3	13 11 4
Virginia	39 $\frac{1}{2}$	551.2	221.7	12 0 7
Havana	37 $\frac{1}{2}$	535.6	215.3	11 15 4

* Short lactation-period due to accident.

At the Royal Show of England the winning Red Poll gave a yield for the twenty-four hours of 51 lb. 8 oz. of milk, testing 4.47 per cent. of fat.

"The details of the milk-yield class at the Royal Show," says a Home writer, "again evidenced the capabilities of the Red Polls for milk-production in competition side by side with all other breeds. In this competition points were awarded as follows: 1 point for every pound of milk; 1 point for every ten days since calving,



A TYPICAL MEMBER OF THE HERD OF THE HON. R. H. RHODES, TAI TAPU,
CANTERBURY.



A GROUP OF RED POLLS.

deducting the first forty days—maximum lactation points 12; 4 points for every 1 per cent. of fat shown on an average of the morning and evening milkings. Eight cows were entered in the Red Poll class, and in the result Lord Rothschild's Clarissa gained first prize with a total of points of 73.03, a record only beaten in the breed class totals by the Shorthorn first-prize winner with a total of 73.70 points. Clarissa had been 139 days in milk, and in the twenty-four hours gave 49 $\frac{1}{4}$ lb., showing a fat-percentage of 3.47 points. The second-prize winner—Lord Rothschild's Rustic—twenty-seven days in milk, gave a total of 51 $\frac{1}{4}$ lb., and 3.10 fat-percentage, her total of points being 63.65. Third prize went to Lord Radnor's Ashlyns Rose 2nd, eighty-nine days in milk, giving a total milk-yield of 43 $\frac{3}{4}$ lb., with 3.52 butter-fat—total of points, 62.73. It may be of interest to state, for comparison, the total of points of the first-prize winners of each breed represented: Shorthorn, 73.70; Red Poll, 73.03; Lincoln Red, 73.03; Jersey, 72.85; South Devon, 68.43; Ayrshire, 65.23; Guernsey, 64.92; Kerry, 62.88; Dexter, 58.18; Longhorn, no prize."

The record of the Red Polls at the fat-stock shows of England clearly proves the fleshing-qualities of the breed. The most successful steer in 1910 had gained in weight from the 1909 show season 340 lb.—a percentage of 26.2, his actual weight at thirty-five months old being 1,683 lb. At the Suffolk fat-stock show of 1911 the open championship was won by a Red Poll heifer, another Red Poll being reserve. The first-prize Red Poll steer at Islington in the same year weighed 16 cwt. 3 qr. at two and three-quarter years of age.

The essential colour of the breed is a deep red, with an udder of the same colour; white at the end of the tail being allowed. The nose must not be dark or cloudy; the head and throat must be neat, the eye full; a tuft of hair should hang over the forehead; and the frontal bones should begin to contract a little above the eyes, and should terminate in a comparatively narrow prominence at the summit of the head. A characteristic Red Poll is a distinctly attractive beast, a strong businesslike type of animal which responds well to good treatment, but will give a decent account of itself under ordinary farm conditions.

NO country can permanently establish a successful dairy-produce trade if the quality of the milk produced and that of the butter and cheese manufactured is ignored.

THE TOMATO.

CULTIVATION AND DISEASE-CONTROL EXPERIMENTS.

T. W. KIRK, F.L.S.

THE outbreak of disease amongst tomatoes in the Christchurch district had become so serious and had caused such heavy monetary losses that growers were almost in despair. They therefore appealed to the Department for assistance. The Government arranged to conduct co-operative experiments in two glasshouses in the district in order to ascertain the various causes of the outbreak, but the owners of the houses asked for such high terms that the Department could not accept them. The Canterbury Fruitgrowers' Association then very kindly agreed to co-operate and endeavour to secure houses on more favourable conditions. This they did, with the result that a house was obtained at Redcliffs from Mr. Maffey, and one at Spreydon from Mr. Odering.

It was felt that some of the growers were proceeding upon wrong lines, inasmuch as they set out their plants in very heavily manured soil, and kept up what was regarded as an excessive degree of humidity in the houses. These conditions were specially encouraging to fungus disease. It was therefore decided to take Mr. Maffey's house and treat it as a whole on lines approved by the officers of this Department, whilst Mr. Odering's should be divided into a number of plots and a series of experiments be conducted therein.

The conditions under which the houses were taken were as follows: The grower to place his house at the disposal of the Department for experimental purposes, he undertaking to perform the work required by the Department in conducting the experiments. The Government to pay for the plants and fertilizers, soil-fumigants, &c., and for the use of the house. In each case the owner to have the crop.

The following instructions in regard to the treatment of the two houses above referred to were given to Mr. Reid, Orchard Instructor, the local officer in charge of the experiments:—

Please arrange to have both houses sprayed as soon as possible with a 2½-per-cent. solution of formalin for disinfection purposes.

As arranged with you verbally, Mr. Maffey's house will receive what we consider to be the best possible treatment in manuring, spraying, watering, cultivation, &c.

Mr. Odering's house will be used for experiments, for which purpose it will be necessary to subdivide into eight plots: Plot 1 to be treated with Apterite according to the directions on the package; 2 to be treated with Vaporite according to directions on

package; 3 to be treated as soon as possible with 2 oz. of kainit per square yard—this fertilizer to be lightly worked into the soil; 4 to be treated as soon as possible with 2 oz. of sulphate of iron per square yard, to be lightly worked into the soil; 5 to be treated as soon as possible with 1 oz. of kainit and 1 oz. of sulphate of iron per square yard, to be lightly worked into the soil; 6, a good dressing of stable manure, such as Christchurch growers are in the habit of using; 7, a light dressing of stable manure; 8, 1 oz. of superphosphate and $\frac{3}{4}$ oz. of bonedust per square yard. 6 and 7 will be applied when the plants are commencing to fruit. 8 will be divided into three, and applied at intervals of a fortnight, the first application to be made when the plants are commencing to fruit. This quantity will not be considered as arbitrary, but subject to increase if the plants show later than one or two more dressings will be beneficial.

Mr. Maffey's house will receive similar treatment to this plot.

Spraying for the control of fungus diseases will commence as soon as the plants are well established after transplanting. This will apply to all plants in both houses.

Thermometers (self-registering maximum and minimum), hydrometers, and diaries for recording results shown by these instruments will be forwarded to you at an early date.

T. W. KIRK,
Director of Orchards, &c.

The experimental work in Mr. Odering's house is not yet completed, but it is anticipated that the report will be available for the next issue of the *Journal*.

Another series of experiments is being undertaken in the Hutt Valley, for the benefit of the tomato-growers in the Wellington District, arrangements having been made between the Department and the Hutt Tomato-growers' Association.

A glasshouse has been secured belonging to Mr. Hobbs, on the main Hutt Road, and arrangements have been made for a piece of land at Mr. Brassell's, so that both indoor and outdoor experiments may be conducted. Both properties are being worked in co-operation with the owners, and the testing will be carried out throughout the varying seasons of the twelve months.

The following is Mr. Reid's report on Mr. Maffey's house:—

MR. E. A. REID'S REPORT.

The dimensions of Mr. Maffey's house are 38 ft. by 17 ft. It has glass sides and ends, and floor of concrete. This floor was laid by Mr. Maffey, sen., mainly for control of eelworm. Operations were commenced on the 31st July. The house was disinfected with a solution of 2½-per-cent. formalin. A warm day was chosen, and the whole of the interior was thoroughly drenched, the solution being applied with a spray-pump. The house was then closed until the following day.

On the 10th August the house was re-soiled to a depth of 5 in. to 6 in., fresh turf soil being carted in from one of Mr. Maffey's allotments; this soil was of a loose sandy nature, and, having a good turf, would be well supplied with humus at a time when plants required it for assimilation. The plants were raised from selected seed by

Mr. Maffey. Seed was sown on the 12th June, and on the 8th July the plants were pricked out into boxes, ample room being allowed the plants for robust development, short-jointed sturdy plants being the aim. The soil, both for seed and pricking out, was sterilized by heating to 210°. It was noticeable that by using the sterilized soil the plants were slow in getting a start, but later on made up for the delay by rapidity of growth and sturdiness, while sterilization prevented any possibility of eelworm infection.

On the 9th September the plants were set out in the house at a distance of 2 ft. between the rows and 1 ft. between the plants. The plants "came away" in good style, and on the 19th September the first spraying of Bordeaux mixture was given, at a strength of 3 lb. of sulphate of copper, 5 lb. of lime, and 50 gal. of water. On the 27th September the plants were tied and trained, as recommended by Mr. S. F. Anderson (see Department's *Journal*, No. 2 of Volume iii).

A second spraying was given with Bordeaux mixture on the 2nd October, and on the 8th the soil—which up to this time had received absolutely no manure—was given a dressing of superphosphate and bonedust, at the rate of 1 oz. of superphosphate and $\frac{3}{4}$ oz. of bones per square yard. This was lightly raked in. On the 22nd October a third spraying was given with Bordeaux, and a fourth on the 9th November, the fifth and final spraying being given on the 25th of the same month. On the 18th November a second dressing of superphosphate and bones was given, at the same rate as the former dressing. As the plants were growing strongly this was deemed sufficient, and no further manure of any description was given.

The fruit colouring at this time, 9th December, sulphur was used and tested for control of "spot" (*Cladosporium fulvum*), and later on, 20th December, the plants were again sulphured. Experiments then ceased as far as spraying and sulphuring were concerned.

CONCRETE FLOOR.

The use of a concrete floor for control of eelworm (*Heterodera radicola*) is to my mind excellent. Up to the present time we have no remedy within reasonable cost that will combat or check eelworm ravages [experiments with soil-fumigants, &c., are being conducted in Mr. Odering's house, and a full report will no doubt appear later], and until such time as a reliable remedy is forthcoming a concrete floor and changing the soil every season is the only reliable safeguard against eelworm infection, and this is borne out by the number of practical commercial growers who have already adopted this remedy. Care must also be taken that nothing but sterilized soil, or soil absolutely free from eelworm infection, is used in rearing the plants.

PLANT-PROPAGATION.

The success of tomato-culture depends to a very great extent on the care in selection of a good type of plant and fruit for seed purposes. Many growers simply select a fair type of fruit and pay no attention whatever to the parent plant, nor do they give any thought to the plants in the vicinity, consequently the number of plants with one truss of fruit and no leader is becoming noticeable. The cause of this peculiarity in some measure may be due to relying solely on selection of best type of fruit, and a plant having only one fruit-truss will naturally possess some good specimens, and a grower not having taken into consideration the constitution and environment will no doubt select these for seed purposes. I am inclined to think that this indiscriminate selection by growers of their own seed, season after season, is causing a deterioration in the constitution and vitality of the plants, thereby making them more susceptible to disease and less resistant to sudden climatic changes. I would suggest paying more attention to the selection of both fruit and plants for seed purposes, and occasionally introducing fresh stock, in order to preserve sound vitality, and also give plenty of room to young plants when "pricking out"—say, boxes of dimensions 12 ft. by 18 ft. Allow six rows and four plants to a row in the box. This will provide ample room for strong development; and aim at getting sturdy short-jointed plants, these being better able to resist disease owing to their strong constitution. The Department has a good illustration of this in Mr. Odering's house. This subject will be again dealt with in the report on experiments in this house.

VENTILATION.

No side or bottom ventilators were used at any time during the experiments, top ventilators being relied upon, and occasionally, during a very warm day, the end doors were used. The use of side ventilation by an inexperienced grower is apt to cause trouble, and the idea of this experiment was to simplify matters and demonstrate that the risk of disaster by indifferent use of side ventilators could be avoided. Many instances have come under my notice where growers, when the house has become too warm, have at once opened the side ventilators, thereby creating a cold draught on the plants in the vicinity. Should any of these plants have been weak in constitution they have at once collapsed, the trouble being in many cases put down as "sleeping disease"—quite an erroneous impression. This experiment proved that this risk of collapse can be obviated by a judicious use of the top ventilators with the assistance of an occasional use of the end doors during the very warm days. Moreover, it is unnecessary to undertake the extra work of manipulating two sets of ventilators when one set

answers the purpose. At least it does so in this district, although conditions may be different in the North Island and necessitate the use of side ventilators. Many of the commercial growers in Christchurch have no side or bottom ventilators in their tomato-houses, but rely solely on top ventilation, occasionally making use of the end doors in very warm weather. This fact speaks for itself, and bears out the above contention that side ventilators, unless used very carefully, are better left alone, and that it is better to rely solely on the method adopted in the above experiment.

"Sleeping disease" as known in this district is not the true "sleeping disease," which is due to the attack of a soil fungus known as *Fusarium lycopersici*.

TEMPERATURE.

The average maximum temperature, taken daily at 1.30 p.m., from the 8th October, 1912, to the 1st January, 1913, ranged from 61° to 104°, the average daily maximum for this period taken daily being 81.5°. The average minimum temperature for same period ranged from 40° to 61°, the average minimum taken daily being 50°.

It was suggested that a maximum working-temperature of, say, 75° to 90° was desirable, but with a variable season and severe changes in temperature almost constant attention to ventilation was required to keep the atmosphere anywhere near this range. However, the average maximum temperature of 81.5° proved a very fair working-temperature for tomato-houses.

WATERING.

To test for humidity of the atmosphere in the house a Lloyd's hygrodeik was used. This instrument, having a carefully graduated chart, makes the matter of ascertaining the degree of moisture per cubic foot in the atmosphere a simple one, and particular attention was given to ascertaining the most favourable degree of humidity for fertilization. It was noticeable that when the humidity was over 70° the pollen was inclined to become pasty, whereas under this reading it was freer, and the lower the humidity the more easily the pollen moved, thus becoming more useful for fertilization purposes.

MULCHING.

To test the question as to whether plants succeed without a mulching of stable manure, no manure or mulching of any description was used. A light raking of the surface soil answered the purpose. The use of stable manures as mulching can easily be abused, resulting in many cases to injury to the plants by too much forcing, and also creating a condition favourable to development of fungoid diseases. For these

reasons artificial manures, applied as before mentioned, were solely relied upon, and although the amounts at first sight appear to be small, yet a little calculation of same proportions per acre will convince one that the supply was sufficient, considering the soil in this house was well supplied with humus. The plants were sturdy, healthy, and fruitful, plainly showing they had ample nourishment.

I am inclined to think that watering after 8 a.m. during fine or warm weather may seriously affect satisfactory fertilization. I should prefer to water the plants after the heat of the day—say, not earlier than 3 p.m. Some growers think that this method is apt to cool the house too much at night, but I do not think it makes any material difference. During warm summer weather I certainly prefer afternoon watering, as it cannot interfere with fertilization, while watering in the morning on a warm day raises the humidity at once, and may, as mentioned above, interfere seriously with fertilization. Again, when watering plants, *water*, do not *sprinkle*; on the other hand, do not *soak*. Water the soil so that the particles of soil will move freely asunder and will not stick together when handled.

The humidity in Mr. Maffey's house from the 6th November, 1912, to the 1st January, 1913, taken daily, ranged from 40° to 94°, averaging daily for this period 68°.

I hope to make further comment on this question when the experiments are completed at Mr. Odering's house, as the Department also dispensed with mulching of any description in this house.

SPRAYING.

It will be noticed that Bordeaux mixture—strength 3-5-50—was used no less than five times, commencing as soon as the plants had hardened after transplanting, and at no time were injurious effects noticeable. Knowing that there is a great difference of opinion among growers as to the Bordeaux solution being injurious, particular attention was given to this matter, and I am confident that spraying, carried out properly, in no way injures the fertilization and setting of fruit. Regarding disease-control, right up to a fortnight after the last spraying very little “spot” (*Cladosporium fulvum*) was noticeable, and there was no sign whatever of other fungoid diseases. The fruit ripening rapidly, and to lessen, if possible, the work of wiping off the Bordeaux sediment, sulphur was blown on the plants with bellows. Later on the “spot” became noticeable, but even then not to any injurious extent. Taking into consideration that other houses on the same property and only a few yards distant from the experimental house were severely attacked by “spot,” and that Mr. Maffey had to move freely from house to house, the test was severe, and in this experiment the

Bordeaux solution, 3-5-50, proved an excellent preventive. I do not consider that sulphur had any appreciable effect in controlling "spot."

Growers complain about having to wash or wipe the fruit after using Bordeaux. These growers will be interested to know that the Department is experimenting with carbonate-of-copper solution in Mr. Odering's house, and if this solution proves successful in controlling fungoid diseases the question of extra labour for wiping and cleaning the fruit will be solved, as the carbonate-of-copper mixture leaves no sediment or deposit.

OTHER REMEDIES.

For slugs and woodlice, or "slaters," tobacco-dust and lime were used, the tobacco-dust especially being very effective.

McDougall's fumigators were used for control of green aphid, and proved excellent. The cost is reasonable, 12s. a dozen, one fumigator being sufficient for 1,000 cubic feet. The operation is simple.

THE CROP.

Unfortunately, no record of crop and prices, &c., from this house was kept by Mr. Maffey last season, so I cannot make any definite comparison between the crop of that season and that of the present one. Mr. Maffey states that the present crop is the best harvested for some seasons. Altogether 622 lb. of tomatoes were marketed, at an average price of 8½d. per pound, which is a fair record for a house of small size.

CONCLUSION.

In conclusion, there are several items in this report which I have not dealt with fully—viz., humidity, fertilization, watering, and spraying—as we have similar experiments on hand in Mr. Odering's house under slightly different conditions, and I wish to compare notes with these experiments before reporting on such important subjects. Thanks are due to Mr. Maffey for his hearty co-operation in carrying out the experiments, and also to Mr. J. Maffey, "The Cutting," Redcliffs, for his assistance.

In looking over young orchards in the Nelson District recently, a fact which struck me very much was the great superiority of "rods" or "sticks" (yearlings) over the "pinched" or "headed" trees. In some cases pinched yearlings are being sold as two-year-olds. On these trees the buds on the lateral growth are frequently semi-dormant, and do not come away well the first year.—*T. W. Kirk.*

HOME SEPARATION.

THE SEPARATOR.

G. M. VALENTINE.

THE PRINCIPLE OF SEPARATION.

To get the best results from machinery of any description it is essential that the operator should understand the principle upon which it is worked. In the case of the cream-separator it is the law of gravity as applied by centrifugal force—in other words, the law which compels any weight to fly to the extreme limits of the circle within which it is confined when rapidly revolved. The inflowing stream of whole milk first strikes the bottom of the bowl, which is running at high speed. It is immediately thrown to the outer wall and is then forced upwards to the skim-milk and cream outlets near the top of the bowl. The skim-milk, being the heavier, is thrown to the outside, while the lighter cream collects nearer the centre. In the old type of hollow-bowl separator this action could be clearly seen. After a long run the bowl would often have a pyramid of very rich cream suspended in the centre. Generally speaking, however, there is no clearly defined line between the cream and skim-milk—rather a gradual shading from very rich cream in the centre to practically pure skim-milk on the outside. First the skim-milk escapes through the outlets provided to the skim-milk covers, while the cream rises to an outlet on or near the top of the bowl, where it escapes to the cream-covers. The higher the speed of any bowl of a given diameter the cleaner the skimming, due to the increased centrifugal force exerted on the milk, and the smaller the diameter of the bowl the higher must be the speed. Speed is perhaps the most important point, and is, I believe, the most neglected. The richness of the cream delivered is regulated by a screw, which acts either on the cream or skim-milk outlets. In the former case the further the screw is turned *in* the nearer it is to the centre of the bowl, the amount of skim-milk which escapes with the cream being thereby less and the cream richer. According to the same rule, if we turn the screw *out* we get a thinner cream. In the latter case, the further the screw is turned *in* the smaller does it make the skim-milk outlet, thereby forcing more skim-milk out with the cream and causing later the cream to be thinner. To turn the screw *out* in this case will give us a thicker cream.

A poor separator makes a discontented supplier, and a discontented supplier is a thorn in the flesh of the factory-manager. It is a source of continuous loss to its owner and to the factory he supplies. The patron of a whole-milk factory is credited with the whole of the fat contained in the milk, and the losses in separation are borne by the factory. With home separation the loss is borne by the supplier, and, as the latter is not generally so well equipped for getting the best results, the loss is proportionately heavier. Farrington says, "Under ordinary factory conditions few separators will deliver skim-milk containing less than one-tenth of 1 per cent. of fat when the sample is taken from the whole day's run. This must be considered a most satisfactory separation." ("Testing Milk and its Products," page 88.) This conclusion is arrived at by gravimetric analyses of samples of skim-milk. The Babcock test does not claim to show the actual fat-content of skim-milk, but, according to the same authority, 0.05 of 1 per cent. must be added to the reading contained by that method to get the correct amount (page 91). This is due to the fact that the finer fats, which are not recoverable during separation, are equally difficult to get into the neck of the bottle in testing. Allowing that 0.1 per cent. is good skimming under average factory conditions, it is probable that there is an actual loss of at least 0.15 of 1 per cent. under the varied conditions obtaining where home separation is adopted. The writer has tested samples of skim-milk showing a fat-content of 0.17 by Babcock's test, or, say, 0.22 per cent. by gravimetric analysis. How this works out in money value may be shown thus, taking 0.15 as average skimming: 1,000 lb. of milk testing 4 per cent. contains 40 lb. of butter-fat. Allowing that this produces 100 lb. of cream and 900 lb. of skim-milk containing 0.15 per cent. of fat, the loss is $\frac{900 \times 0.15}{100} = 1.35$ lb. of fat, equal to 3.375 per cent. of the total butter-fat contained in the milk—i.e. $\frac{1.35 \times 100}{40} = 3.375$ per cent. This in a herd of fifty cows yielding 200 lb. of fat per year each represents a loss of £16 17s. 6d., at 1s. per pound for butter-fat. A portion of this loss is, however, unavoidable. Where whole milk is delivered to a factory the loss is made by the dairy company, whereas where the farmer skims his milk it is he who suffers the loss. What the loss is when separating is carelessly done can only be guessed, but these figures will serve to show the absolute necessity of exercising the greatest care both in the selection of a machine and in the subsequent use of it. The first question asked of a separator salesman is, "Does it turn easy?" The first one should be, "Does it skim clean?" Clean skimming, accessibility for cleaning, durability, and light drive are of prime importance.

TIME OF SEPARATING.

The best results are obtained when milking and skimming proceed simultaneously, and when this is possible the separator should be of such a size that a start can be made as soon as milking is well under way, always provided that the number of milkers employed is such that the milk will not be left standing long enough to become cold while waiting for enough to be milked to keep the machine going. Neither must the separator be run so long that the accumulation of dirt in the bowl will interfere with clean skimming—say, an hour and a half. If the milk has to be left until milking is finished, a feed-tank with a false bottom should be provided, so that the temperature can be raised with hot water. In this case the bigger the machine the better.

HOW TO SET UP MACHINE.

Having chosen a machine, carefully read the directions. Set it on a firm base, preferably of concrete or a block of wood set into the floor. Leave a space of about 1 in. between the block and the base of the machine by means of a reel at each screw-bob. This prevents oil, &c., from accumulating under the machine, and allows of washing. See that the frame is perfectly level after it is screwed down. Thoroughly oil all bearings. Use only a high-grade oil made specially for this purpose, as on this chiefly depends the ease in driving, and the life of the machine. Carefully wash and scald the bowl and all tinware, to remove the grease with which they are smeared; then put the machine together again, with all parts in their proper place, and you are ready to start separating. Avoid sudden jerks in starting, or you will run the risk of snapping the ratchet-pawl in the handle, which is very hard and brittle. Raise speed slowly, taking care in the hand-machine to apply an even pressure on the handle. A heavy push on the down stroke will only cause irregular running of the bowl, and will tend to wear the bearings and gearing unevenly. The separator must be run at the speed given by the maker, but it is better to err on the side of overspeed rather than underspeed. The hum of the machine gives an indication when the speed is right, but this must not be relied on. A metronome placed where it can be seen and heard, and set to the speed of the handle, is the best means of counting. Satisfactory results will not be attained when stops have to be made to fill up the milk-cistern. Slow speed will give more cream of a lower test, and will cause a big loss of fat in the skim-milk. Excessive speed will give less cream of a higher test, and ensure a more perfect separation. Take care that the speed is up before turning on the milk, and see that it is maintained when the extra weight caused by the milk in the bowl is felt. With the increasing use of the milking-machine the power-driven

home separator has also become more common, and, if intelligently used, should give better results than the hand machine, as a more even speed can be obtained. Where the motive power is steam, turbine machines are most popular, and in good hands do very good work. With an oil-engine plant a hand-power machine, with fast-and-loose pulley attachment, a friction-clutch, or governor-pulley, is usually found, all of which are more or less satisfactory, but require careful watching to see that the belts or clutches are not slipping. It is absolutely necessary to try the speed of the machine at intervals during each separating. This can be easily done by counting the number of revolutions of the driving-shaft on the separator.

TREATMENT OF SEPARATOR.

Return the first two or three gallons of skim-milk to the feed-tank, as it has always a fairly large percentage of butter-fat left in it. While the best temperature for separating is the natural heat of the milk as it comes straight from the cow, good results will be obtained with fresh milk not colder than 86° Fahr. If the milk from one milking is left over till the next, it will be necessary to heat it to 96° Fahr. before separating, and it will be all the better if held at this temperature for a few minutes to ensure a thorough heating of the fat-globules. Cold milk will give less cream with a higher test, but will mean a very serious loss of fat in the skim-milk. This is caused by the increased viscosity, or stickiness, of the cold milk, which prevents a clean separation of the fat. The amount of milk fed into the bowl is regulated by a float, which will act well with the tank supplied with the machine; but if a larger tank is required the pressure on the float will be greater, and care must be taken not to feed the machine too fast, as this will result in a thin cream and loss in the skim-milk. Underfeeding is also to be avoided. An uneven feed will cause an accumulation of thick cream in the bowl, and a consequent loss in skimming. Maintain a uniform feed, speed, and temperature throughout the run, and flush out at the finish with a gallon of skim-milk or clean warm water, to force all the cream out of the bowl. Wash the separator *immediately* after separating is finished, and do not forget to keep the frame sweet and clean as well as the bowl and tinware. Set the machine to deliver a cream containing not less than 40 per cent. of butter-fat, but do not be surprised if the test should vary a few points either above or below that from time to time, without altering the cream-screw. The test will be higher if the machine is run overspeed, the milk too cold, the feed not sufficient or irregular, and the cows are going off in milk, &c. Thin cream will result from slow speed, overfeeding, fresh cows, cold

weather affecting cows, too much flushing of the bowl, and the machine running rough, &c.

A separator which is in good order should run with a smooth musical hum, and without vibration, and should deliver the cream and skim-milk in a steady stream. Vibration and noise are signs of something wrong, and should be seen to at once. The more common troubles are—frame not being level, bowl-spindle bent, a broken spring in the top bearing throwing the bowl out of plumb, bearings worn and having too much play. A frequent cause of trouble in disc machines is through the discs getting worn with use, and fitting loosely on the centre pillar, thus causing vibration. This can be overcome by putting an extra disc in the bowl.

A separator set to deliver a 40-per-cent. cream in spring with fresh cows will give a much richer cream in the autumn, all other conditions being equal, and will require to be altered a little. A sample of skim-milk should be tested frequently. This can best be done by punching a small hole in the shoot, if one is used, and catching the drip. If there is no shoot, a large jug, or billy, can be held under the skim-milk spout at frequent intervals during the whole run, and a sample taken from it after it has been thoroughly mixed. The fact that no cream rises on a sample of skim-milk is no proof that it contains no butter-fat. The argument that "the calves and pigs get it anyhow" is, after all, only an excuse for bad work. The old saying that "if a thing is worth doing at all it is worth doing well" still holds good. If you are going to separate your own milk, do it as it should be done. You will be surprised how interesting it will become. By all means rear good calves and pigs, but make a business proposition of that also, and remember that butter-fat at 1s. per pound is rather expensive pig-feed.

GREEN MAIZE.—The dairy-farmers of the South Island are coming to appreciate the value of green maize for their milking-cattle. In the North maize is the chief means of maintaining milk-production when grass dies off. The climate of the North is naturally more suitable for the cultivation of maize, but even in the South maize for green fodder succeeds in average seasons. The experimental farms and the co-operative field plots have effected useful work in popularizing the cultivation of this plant. Quite recently a party of farmers inspected a heavy crop of maize near Christchurch—grown in a series of field-plot demonstrations. The party was highly gratified at the result. The South Island Fields Instructor, Mr. A. Macpherson, expresses his great appreciation of the help he receives from the cordial concurrence of the farmers who undertake these trials.

A NEW SPECIES OF GRASS-GRUB.

A SERIOUS PEST OF SEEDLING FOREST-TREES.

A. H. COCKAYNE.

A CONSIDERABLE loss is annually sustained in the seedling-beds at the State Forestry nurseries through the roots of the young trees being destroyed by the larvæ of certain species of grass-grubs. I was under the impression that the damage was occasioned by the ordinary grass-grub (*Odontria zealandica*), so well known in New Zealand on account of its very serious effect on pastures. A visit to the Whakarewarewa State Nursery in the second week of last December showed conclusively that the insect damaging the seedling trees at that nursery was not *O. zealandica*, as full-grown larvæ were abundant in the larch-beds at that date. If the damage had been due to *O. zealandica* there would have been very few larvæ present, as normally the majority would have pupated and emerged during the latter part of November.

No method for distinguishing the various species of grass-grubs while in the larvæ or grub stage has yet been worked out, so it was necessary to wait till the beetles emerged before the species could be ascertained. From the size of the grubs they were thought to belong to one of the larger species, such as *O. sandageri* or *O. striata*. On the 27th and 31st January a fine series of the beetles collected in the ground before they had taken to the wing was received by me from Mr. H. A. Goudie, Superintending Nurseryman of the Forestry Branch of the Lands and Survey Department. Being unable to determine the species, I sent specimens to Major Thomas Broun, the well-known Coleopterist, who decided they belonged to a new species, and named it *Odontria puncticollis*. He very kindly drew up a diagnosis of this species, and this is appended.

The following notes supplied by Mr. Goudie give some interesting information with regard to this insect:—

On the 23rd January a blank portion of one of the larch-beds, where all the trees had been killed, was selected: $1\frac{1}{2}$ ft. by the full width of the bed—viz., 6 ft. All the soil to a depth of 9 in. in this space was put through a sieve. Ten grubs were obtained in this way, most of them from 6 in. to 9 in. from the surface. Below this the subsoil to a depth of 6 in. was taken out and screened, with the result that I secured twenty fully developed beetles, and eleven in the pupa stage, or forty-one in all. If this is representative of the whole of the beds, then there are about five thousand grubs in each bed, or about one grub to three trees. Probably the grubs have been going down into the subsoil since about the beginning of November. They apparently

burrow into the hard subsoil, where they pupate. The beetles will probably emerge from the ground about the beginning of February. The larch-beds are in a frightful state, there being huge patches in which every tree is dead. I propose laying scrim over these places in order to catch the beetles as they emerge from the ground. There is no doubt that tillage is the best means of eradicating this pest. I have tried to get grubs and beetles in various other places without any great success. Breaks Nos. 5 and 6 were sown in larch in October, 1910. From July, 1911, to July, 1912—when the crop was lifted—the grubs were very bad. The soil was top-dressed with apterite in August, 1912, and was well harrowed and ploughed deeply. Cow-peas and Soya beans were sown in November, 1912. I have since failed to find a grub or beetle. A horse-paddock has been in grass for ten years. Here the land is very hard and consolidated, with the turf 4 in. thick. A few grubs were near the surface. Block 1 was sown with Corsican pine (*Pinus laricio*) in October, 1910. The crop was lifted in July, 1912, no grubs or beetles being discovered. It was sown in prairie-grass in October, 1912, and no grubs or beetles are now present.



ODONTRIA PUNCTICOLLIS, MAGNIFIED FIVE TIMES.

1, Antennæ of male, magnified thirty-five times; 2, antennæ of female, magnified thirty-five times.

On the 6th February a large flight of *Odontria puncticollis* occurred, over one hundred beetles being collected by hand in a few minutes. This shows that the time of the main emergence differs very considerably from that of *Odontria zealandica*, and, in consequence, the control measures for *O. puncticollis* will be different to those that would be effective against *O. zealandica*. A small flight of the Rotorua grass-grub occurred in September, and I am inclined to think this is due to a small proportion of the grubs not completing their life-history in the twelve months.

It is a matter of great importance to determine what are the species that are causing damage in the southern nurseries, as until that is known and their life-histories are worked out it is useless to endeavour to formulate control measures.

DATA REQUIRED.

The following data are urgently required with regard to *Odontria puncticollis* :—

- (1.) Dates of emergence of the beetles.
- (2.) Crops in which egg-laying takes place.
- (3.) Length of time the grubs remain in the larvæ condition.
- (4.) Food-plants of the adult beetles.
- (5.) Food-plants of the grubs.
- (6.) Effect of fires in destroying the beetles.
- (7.) Effect of spraying and application of soil-fumigants—(a) poison sprays, (b) deterrent sprays, (c) soil-fumigation.

When reliable data under these headings have been secured a satisfactory method of control should be able to be devised so far as protecting the young trees is concerned. This is extremely important, because this insect is greatly increasing the cost of the production of certain trees, notably the larch. Any reduction in the cost of the raising of trees is of fundamental importance in forestry, and this is especially true of species with a long rotation.

SUGGESTED METHODS OF CONTROL.

One of the most suggestive methods of control would be the covering of the beds each evening with beetle-proof frames during the short period the beetles are on the wing. The present seed-frames employed could easily be adapted for this purpose. It is more than probable that the main flights will occur at approximately the same date each year, and if the beetles are stopped from laying in the beds during that period the damage should be reduced to a minimum.

The important fact that *O. puncticollis* does not damage Corsican pine is a most suggestive one. It would appear as if the beetles do not lay any eggs in soil occupied by seedlings of this pine. This appears to be correct, as larch-trees that come up accidentally in the Corsican-pine breaks are not affected. It might prove feasible to combine the sowing of a certain amount of larch with the Corsican pine, and this is a matter that can easily be determined. The Corsican pine is an extremely aromatic one, and the question of experimenting with deterrent sprays may probably yield valuable results. If any specially favourite food-plants for the beetles are found, the growing

and spraying of these with arsenical washes might prove a valuable method of control.

The following is Major Broun's description of *Odontria puncticollis* :—

GROUP MELOLONTHIDÆ.

ODONTRIA, white, Man. N.Z. Coleopt., p. 265.

Odontria puncticollis, sp. nov.

Subovate, broadest near the hind thighs, moderately convex, somewhat nitid; head and thorax reddish-chestnut, elytra and legs rather paler, the latter often testaceous; sparingly covered with distinct, decumbent, moderately short, yellowish hairs, but also with longer erect ones along the sides, the base of elytra thickly clothed, in the middle, with elongate pubescence.

Head coarsely and moderately closely punctured, except at its extreme base, the forehead with reflexed, well-developed margins, broadly rounded in front, the upper surface nearly nude. *Eyes* large, only slightly convex, hyaline. *Thorax* almost twice as broad as long, its sides finely margined, nearly straight, and only slightly narrowed behind the middle, gently curvedly narrowed towards the front; anterior angles acute, the posterior somewhat rounded; base widely sinuate towards the sides, rounded in the middle, the apex widely emarginate; its surface very distinctly, moderately closely and evenly punctured, frequently with a smooth linear space along the middle. *Scutellum* punctate, cordate or suboblong. *Elytra* thrice the length of the thorax, of the same width as it is at the base, gradually dilated posteriorly, the apices rounded at the sides, much less so, sometimes subtruncate, towards the suture; on each elytron there are nine fine striae, the outer ones indistinct, the central ones obsolete near the shoulder; interstices plane, their punctation distinct, slightly finer than that of the thorax. *Pygidium* broad, with distant subgranular sculpture.

Under-side more or less finely punctate, fusco-testaceous, the abdomen a little shining and often fuscous in mature individuals; the sternum with numerous elongate, slender, fulvescent setæ, those on the femora erect.

Male.—Antennæ rather short, basal joint elongate, oblique and thickened at the extremity, the second as stout but only half as long, third more slender, fourth stout, angulate, and generally slightly produced in front; club minutely and densely pubescent, composed of four nearly equal leaflets.

Female.—Fifth antennal joint short, usually somewhat prolonged in front, but only a third, or less, of the length of the club, which is triarticulate and shorter than that of the male.

Length, 12–14; breadth, 7–8 mm.

This species can be distinguished from almost all the others by the very distinct, though not coarse, thoracic punctation, which is quite perceptible to the unaided eye, whereas in many other cases the punctures, either very fine or obsolete, can only be detected by means of a powerful lens. As a further aid to identification, it may be stated that, with the exception of White's *Rhizotrogus zealandicus*, 474, and one or two others, the surface is opaque and often maculate, and the elytra in some instances broadly sulcate. In the more closely allied, but larger, much paler, and rather more glossy, *O. nitidula*, 3233, the hind angles of the thorax, though obtuse, are more rectangular, and only those striae that are near the suture are well marked.

Specimens collected by H. A. Goudie, in larch nursery-beds, Whakarewarewa, 6th February, 1913. The illustration is drawn from nature by Mr. E. H. Atkinson.

A very striking demonstration of the success of dry farming when aided by green-manuring may be seen in No. 40 paddock (lately reclaimed, and naturally very poor) at the Ruakura Farm of Instruction. A crop of crimson clover was recently ploughed under, and is now growing a splendid crop of tares and barley which is quite unaffected by the dry weather. The land was thoroughly worked, and when the crop was sown was left unrolled so as to ensure a deep, loose surface mulch.

PRAIRIE-GRASS AND LUCERNE.

T. W. LONSDALE.

WITH the object of deciding the value of prairie-grass and lucerne as a temporary pasture in a crop rotation, an area of 6 acres at the Moumahaki Experimental Farm has been laid down to this mixture. The land previously carried a crop of vetches and rye-corn, which was cut and threshed for seed, after which the soil was ploughed.

In the autumn of last year the prairie-grass and lucerne was sown, 20 lb. of the former and 10 lb. of the latter being used. The crop came away well, and throughout the winter and early spring it provided splendid feed for store sheep and ewes and lambs. It was pastured till October, when it was closed for mowing. After developing a thick growth of about 2 ft. it was made into hay, the growth representing a weight of 10 tons of green material to the acre. The hay was an excellent sample. A fortnight after stacking was completed there was a heavy aftergrowth, which has been almost continuously grazed to the present time by dairy stock. Both sheep and cattle eat this mixture with avidity, and it is apparently admirably suited for fattening and milk-production. It has been noticeable that when the dairy cows were taken off this feed and put on to good pasture the milk-yield declined, notwithstanding that the pasturage was supplemented with ensilage carted out. After the prairie-grass and lucerne had been given a rest of several days in which to recover, the milk-flow rapidly increased on the cows being returned to field. This mixture is definitely a temporary crop, and should not be expected to last more than two years. At Moumahaki it has provided heavy feeding for six months, and should be good for at least another year. In addition to this, the heavy crop of hay was obtained. Though it is desirable to utilize the land for other purposes when the wealth of feed diminishes, the lucerne, of course, will continue to make growth if not disturbed. But the ploughing-in of the lucerne and prairie-grass will undoubtedly enrich the soil, and provide a good seed-bed for subsequent crops, and this with little manuring.

Extensive tests are being conducted at the Moumahaki Experimental Farm to determine the most suitable varieties of potatoes for the environment, their disease-resisting capacity, and their manurial requirements. Altogether sixty varieties are under trial. Several experiments are being conducted in regard to the effect of different specifics in warding off disease. All the potato plots are looking remarkably healthy.

SOWING ONION-SEED.

W. H. TAYLOR.

THERE is much diversity of opinion as to the best time to sow onion-seed, but I am bold enough to say it is only among men of little experience that such diversity exists. Those who have been long at the game, or who have had the advantage of a good training, work on definite fixed rules. Giant Rocca, and all similar large-growing varieties, must be sown in autumn, or they will not attain large size, and they are not worth growing unless they do that. Regarding keeping-varieties, spring sowing would be always best but for the fact that in many places mildew is very destructive, and when that disease attacks them they seldom ripen off properly, or, if they do, they are likely to be small. Experienced men who are working in such circumstances know two things which guide their action: First, it does not pay to handle a large number of small onions; secondly, autumn-sown onions seldom keep as long as spring-sown. They compromise by sowing at both times. Autumn sowing provides good-sized bulbs for early handling, and spring sowing smaller ones that keep longer. The reason why those sown in autumn are not injured by mildew is because the disease does not make its appearance till about February, and they have nearly finished growth by then. Being earlier than those sown in spring, they ripen early in March instead of late in the month.

An important fact that must not be forgotten is that all autumn-sown onions must be transplanted in spring, or a large number will run to seed. Keeping-varieties show very little tendency to bolt when they have been transplanted.

Regarding silver-skinned, my experience has been that they seldom keep long, though I have seen Silver King and Silver Glove keep well, but they came from a favoured place.

I have had considerable trouble with English seed, a very large proportion coming bull-necked. Australian seed is best for this country.

An eighth of an acre of Buda kale at Moumahaki Experimental Farm, which last year produced feeding-material at the rate of 57 tons to the acre, was allowed to go to seed. The result was highly gratifying. Though the small birds were very troublesome, and it is estimated from close observations they took fully half the seed, the threshing produced a fine sample, representing a return equal to a local market value of £48 per acre.

GRAZING OF LUCERNE.

EXPERIMENTS AT MOUMAHAKI EXPERIMENTAL FARM.

IN the brief history of lucerne-cultivation in this country the grazing of it has not yet been tested. Now, however, an experiment is being conducted at Moumahaki Experimental Farm to determine the best means of grazing an established field by both cattle and sheep. The field where the trial is being made has been in lucerne for two years and a quarter, and the plant is there thoroughly well established. After the first cutting of this season 525 head of sheep (ewes and lambs) were turned in on the 7 acres. At this time the lucerne was 18 in. in height—rather high for feeding off, the wet weather which prevailed having made it necessary to postpone the stocking. The sheep, not being accustomed to the rich feeding, were not kept continuously on the lucerne for the first few days. They were taken off after two hours' feeding the first day, on the second day they had four hours' grazing, and on the third day they were allowed to remain in the field. The sheep rapidly improved in condition, and on the tenth day, the lucerne being eaten down to a safe height, about 2 in. above the crown, the sheep were taken off. When put on the lucerne the sheep were in forward condition, and the bulk of them were fit for freezing when taken off. After seven days, the lucerne having recovered sufficiently, 300 lambs, just weaned, were turned on, and remained for a period of seven days, being taken off after a few hours' feeding for the first few days, as with the first lot. The lambs were followed by 260 ewes, which remained on the lucerne for seven days. The field remained without stock for seven days, and the 260 ewes were returned and depastured for another week. After this seven young bulls were turned on, and remained for ten days. The field was then closed up. As far as the eye could see, there was no deleterious effect on the plant, which is growing as vigorously as before. The 7 acres are now being subdivided, and experiments to test the gain in weight in fattening will be carried out.

During February the three main experimental farms of the Department were visited by 1,270 farmers. Ruakura Farm of Instruction attracted 735, Moumahaki Experimental Farm 460, and Weraroa Experimental Farm 75.

SCRUB LAND.

ITS EFFECTIVE UTILIZATION TO BE TESTED.

A LARGE extent of land in the Waimakariri and West Eyreton districts of Canterbury is not in profitable occupation. Its character is peculiar. The chief feature in the formation is a mixture of gravel and sand, more or less covered with soil, these combining in varying proportions. The open nature of the substratum can retain water but feebly. This is general over the whole of the area, and is naturally the cause of the difficulty of useful occupation. Where the soil is in reasonable proportion good crops are raised in seasons of abundant rainfall. Where the boulder and gravel are in the greater proportion the natural vegetation is reduced to manuka, a certain amount of danthonia, and grey moss.

Some of the owners have approached the Department with a request to test plants and methods of cultivation that may assist to provide profitable utilization. With this in view the South Island Fields Instructor, Mr. A. Macpherson, has arranged that a typical area near a road be selected. This land will be available for the Department for five or seven years, to permit of comprehensive experiments being conducted to definite conclusions. The scrub will be felled and burned, and the land ploughed. The experimental area will be enclosed with a vermin-proof fence, while shelter-trees will be planted on the exposed aspect. The Department will provide seeds, fertilizers, and the plan of operations under the supervision of its officer. The farmers will provide the required labour. It is expected to proceed with the operations this autumn.

The most effective move towards reduced cost of living is the production of greater crops. This is attributable to the work of the Department of Agriculture, the agricultural colleges, and the experiment stations, and the help of the Press in publishing every movement to help the farmers. Demonstration work in Southern States in the fields has been of immediate benefit. The South has increased the food-supply very much in the last few years. The movement ordered by Congress to take farm demonstration into all Northern States will bring more food into our markets. Our fields can and will steadily increase their output in coming years as ways and means of growing heavier crops become better understood.—*Scientific American*.

TOBACCO - GROWING.

A. W. GREEN.

SEVERAL attempts have been made in New Zealand to establish the tobacco-growing industry, but without any marked success. Consequently the area now planted in tobacco is much less than that of some former seasons. The general opinion of old settlers visiting Ruakura



TOBACCO-PLANT AT RUAKURA FARM OF INSTRUCTION.

supports this statement, for when passing the tobacco-plots they invariably refer to having grown crops over twenty years ago, and having seen large tobacco-plantations cultivated by Maoris. On the other hand, younger farmers frequently state that it is the first time they have seen the plant growing.

There are several difficulties to face by any one who attempts to grow, cure, and sell the leaf, and it is probably these difficulties which have checked the industry. The price of labour is the main obstacle, for the crop requires much attention, and that during the busy season of the year, from November to March. Secondly, the plant must be grown to perfection, in order to compete with foreign tobacco in quality and flavour. This limits the areas to suitable soils and favourable situations, where the plantations can be sheltered from wind and lie exposed to the sun for the greater part of each day. Again, until growers could supply leaves in sufficient quantities to meet the demand of manufacturers, the latter much prefer to buy in foreign markets. where from a number of samples submitted they can choose one which when prepared will give them their standard article. Should numerous growers be induced to enter the field for tobacco-growing, this last-named difficulty would be easily overcome, for tobacco of good quality can undoubtedly be grown in New Zealand.

The accompanying photograph of a specimen plant growing at Ruakura will serve to illustrate the success achieved after experimenting with different varieties and manures. A tobacco expert who lately inspected this plot considers the quality excellent, and stated that he never saw better-grown plants in the United States. He estimated the crop at 9 cwt. of dried leaf per acre, and valued it at 1s. 6d. per lb. The soil is of a light sandy nature, shallow, with gravel subsoil. This is not by any means the most suitable soil, a deep well-drained sandy loam rich in humus being far superior for the purpose.

Poultry-manure has given the best results, but when this is unprocurable farmyard manure must be substituted. With either of these manures it is advisable to plough them in some time before planting. With artificial manures, dissolved bone and sulphate of potash surpass all others on this soil. The sulphate of potash adds quality to the leaf. The Maoris applied wood-ashes to their plantations, mixing these well with the soil. The variety which best adapts itself to this climate and soil is one named Pryor Virginia, secured from Australia by Mr. A. Chocqueel, a local manufacturer of tobacco. It far surpasses the Old Virginian, Turkish, or Connecticut previously tried here. The leaves are of a darker shade of green, are larger, and contain more oil. Many of them measure 18 in. across and 30 in. in length, while the largest leaves of Old Virginian do not exceed 11 in. by 18 in.

A few notes as to the cultivation adopted with this season's crop may here prove interesting. The seed was sown in trays under glass on the 14th October, 1912. The seed germinated in seven days, and the young plants appeared above ground on the 25th October. These were transplanted into rows 3 ft. apart each way on the 17th December. The soil was hoed three times to check weeds. Hoeing must not be deep close to the plant, as this destroys many fibrous roots. As side

shoots appeared they were pinched out, the leading shoot only being allowed to grow. On the 16th February the leaders were stopped, with the exception of those plants required for seed. An average of fifteen leaves were left to develop on each plant.

First-grade seed is obtained from the uppermost flowers, so that all lateral branches of the inflorescence were removed early.

Stopping the leaders forces suckering, and these growths must not be left to develop, otherwise the quality of the leaf is diminished.

Much care is needed when working amongst the plants, for during ripening the leaves become brittle and easily break across the midrib.

At ripening the plant presents an entirely different appearance. The top leaves attain a size equal to the lower ones; secondary suckers commence to shoot out below the bottom leaves at the soil-level; the colour changes from a deep green to a yellow spotted appearance, and all leaves become much wrinkled.

It is expected that the crop at Ruakura will be ready for harvesting about the 15th March.

RUAKURA MANURIAL EXPERIMENTS.

PRIMROSE McCONNELL.

IN connection with the permanent manurial experiments (this year being tested with a swede crop), the plots manured with a mixture of guano and sulphur take the lead, while highly nitrogenous manures, such as blood and bones, stand at present at the bottom of the list. On a previous occasion I ventured the opinion that the damage caused by blights and parasites was to some extent due to the exhaustion of the soil, in which condition it could not produce a plant sufficiently robust to resist an attack of the above nature. This opinion would seem to be emphasized by the fact that, although the cabbage-fly has done some slight damage to the manured plots of swedes, the unmanured plot is so much damaged as to be in some places past recovery. In the mangel-paddock the cross-dressing of sulphur and lime now stands up very clearly, the colour of the foliage being of a deeper green than other portions of the paddock. On the other hand, where sulphur was applied alone, at the rate of 5 cwt. per acre, the crop is at present not as good as that grown with no manure at all. Nitrolin applied as a top-dressing had no visible effect on the oat crop, but, strange to say, has had a marked effect on the colour of the soil, the portion dressed being of a much darker colour than other portions of the paddock. All pastures are at present so brown that no comparison can be made of top-dressings.

A WELL-MANAGED FARM.

THE WAIMAHAKA ESTATE.

A. MACPHERSON.

THE farm of the late Mr. James Holmes, of Waimahaka, Southland, is regarded as one of the best managed in the South. Some particulars of the methods in vogue—introduced by the late respected owner and continued by his son, the present manager—may be of interest and assistance to others engaged in farming similar country and following the same phases of primary production. They are assuredly worthy of emulation.

The property consists of 1,641 acres of freehold, of which 1,000 acres are in grass, 200 acres in turnips and oats, and the balance of 441 acres in native bush. There are also 250 acres of leasehold. The land is undulating. Some of the grass-paddocks have been down fifty-five years. The mixture of grasses sown has not been varied since the first paddocks were laid down, and is as follows: Perennial rye-grass, 20 lb.; Italian rye-grass, 5 lb.; meadow fescue, 7 lb.; meadow foxtail, 2 lb.; crested dogtail, $\frac{3}{4}$ lb.; timothy, 5 lb.; cocksfoot, 5 lb.; cow-grass, 3 lb.; white clover, 2 lb.; alsike, 1 lb.: total, 50 $\frac{3}{4}$ lb.

The pastures are excellent, being covered with a thick sole of succulent grasses, the most prominent varieties being cocksfoot and perennial rye-grass.

The cultivation given is somewhat on the following lines: The land is broken up as a rule in the month of June, ploughed 6 in. deep, and fallowed all winter; double-disced the same way as ploughed and double-disced at an angle; tine-harrowed three times and Cambridge-rolled. The land is cultivated for five years before laying out to grass. During that time usually two crops of oats are taken and three crops of turnips. The oats are drilled in, and the turnips are sown on ridges. No fertilizers as a rule are applied when oats are sown, but for turnips 3 cwt. of manure per acre is used, two-thirds of the mixture being bones and one-third superphosphate. The bulk of the land under cultivation has been subsoiled. All the cultivated land has been limed at the rate of 2 tons per acre. The liming is done before sowing down with grass. A light chain harrow is used to cover the grass-seed. The land is not rolled afterwards.

Swede and yellow- and white-fleshed turnips grow well, the seeding being—swedes, 2 lb. per acre; yellow- and white-fleshed turnips, 1 $\frac{1}{2}$ lb.

per acre. The plants are thinned out to about 8 in. apart in the rows, and intercultivation is frequently given. Amongst a number of varieties tested Crimson King has proved the best swede, and Aberdeen Green-top Yellow and Stobo Blue the best of the yellow-fleshed turnips.

The stock carried from year to year consists of—Cattle, 400 purebred Herefords; sheep, 1,500 purebred Romney Marsh; horses, 30 draughts and a few hacks. Besides the foregoing, there were also at time of my visit 700 lambs and 150 calves. With the exception of males for stud purposes no stock is bought in. The Hereford herd and Romney Marsh flock are said to be among the oldest established in the Dominion.

Three teams of horses are employed to carry out the work of the farm.

POTATOES.

SELECTION AND STORAGE.

T. W. LONSDALE.

THE time is opportune for a few words regarding the selection and storage of potatoes from which next season's crop will be raised. Many growers lift and cart the whole of the crop direct to the shed, the tubers being afterwards sorted as time permits. When stored in this promiscuous way the tubers heat, thus causing them to send out long spindly shoots which are easily broken off. These shoots, being the first, should also be the strongest; later shoots will not produce good plants. Moreover, by allowing the clamp to heat, a great many potatoes fail to germinate, with the result that, instead of an even crop, numerous blank places occur.

When lifting the crop, selection of seed should receive immediate attention. This is best done by observing which plants produce the most marketable tubers, and if these are true to type of their variety, select seed from these plants and discard those which give an uneven and light yield.

The tubers should then be placed in shallow boxes where the light and air can freely reach them. The eyes start into growth slowly, and the shoots themselves are short and not easily broken. When planted they grow away without any check, and time is saved which, in a season of growth as short as that of the potato, is most important.

Numerous experiments have shown that the selection and sprouting of the tubers give an increased yield. Should not every grower, therefore, aim at producing the utmost on the land he cultivates?

COW-TESTING.

NOTES ON THE SEASON'S WORK.

W. M. SINGLETON.

THE extension of the cow-testing movement this season has been gratifying, and bears splendid evidence to the fact that dairy-farmers are improving their herds, and are doing so by building on sound basic principles. There are some twenty associations in operation this season, and already there are others mooted for next season.

The associations represent the testing of some 25,000 cows this season. These monthly tests prove good educative factors when taken in the right way. The dairyman has a chance to get a better idea of cow-nature, and interesting avenues of thought are open to the dairyman who is a student.

Possibly the matter which puzzles some cow-testing-association members most is the variation which occasionally occurs in the individual tests of a cow. This seldom applies to many cows of the herd, it being the general experience that tests do not vary more than three or four tenths from month to month. Still, some cows do vary very considerably at times, and over 1 per cent. of variation may be evidenced in the tests of certain cows over two consecutive periods. This does not indicate that the testing is wrong, for we have ample evidence that such variations occur where the strictest care is taken with the sampling and testing. Further than this, it is our experience that even where the sampling and testing are right, where the cows are milked punctually on the stroke of the clock, and where cows are treated kindly and never hurried—even under these ideal conditions—variations of over 1 per cent. on the Babcock bottle are to be found occasionally in the test of a few cows between two consecutive months.

Such variations might suggest that cow-testing is not sufficiently reliable for the dairy-farmer. We believe it evidences the fact that one or two tests only for the season may be very misleading, and that tests should be made at regular intervals, monthly, during the whole lactation period to ensure good results. With a number of tests variations tend to counteract themselves. In any case it must be remembered that very few members have even one cow showing the extreme variations indicated above.

A comparison of cow-testing-association returns and factory returns for the season are interesting. In one association it was found that

for the whole season we had credited the average cow in that association with 10 lb. of fat more than that for which the factory paid. This 10 lb. would be accounted for by the following considerations:—

- (1.) We credited each cow with yield from date of calving, whereas this cow's milk would not be delivered at the factory for three or four days.
- (2.) Our yield for season includes milk fed to calves. The factory return does not.
- (3.) Our return includes milk used by the household and any spilled. The factory return does not.

The variation of 10 lb. of fat would be just about the quantity these items would represent in the average herd, and these figures go to show that the system of cow-testing-association work followed in New Zealand is sufficiently accurate for the purposes of culling inferior cows and selecting the best cows of the herd for breeding purposes. In fact, the system is all right for anything save making records for pure-bred cows—a phase of cow-testing provided for in another way.

GREEN FODDER FOR DAIRY COWS.

T. W. LONSDALE.

It is an admitted fact that the best returns cannot be obtained from dairy stock except under a liberal system of feeding, and this should be maintained right throughout the lactation-period. Many farmers will acknowledge that they seldom supply all the members of their herd with sufficient feed at all seasons of the year to induce them to provide their maximum flow of milk. The proper feeding of dairy cows is one of the most pressing problems of the day. It is gratifying to know that milk-producers in this country are realizing the necessity for more attention being paid to this matter. Many kinds of fodder are being grown for the purpose. A fodder which is not appreciated as it should be, and one which is in great favour in older-established dairying-countries, is a mixture of oats and peas. There are numerous varieties of oats, some being more suitable than others, for providing a large amount of fodder. It is therefore advisable to select the oat best adapted to the purpose. It is questionable whether a better variety than the Triumph is available for producing green fodder. Grown in conjunction with peas, it provides an ideal food for dairy stock. The Triumph is a strong-growing variety, and produces a great quantity of flag and a strong upright straw. It is, therefore, well adapted for giving the necessary support to the peas, whereas an oat producing fine straw would be useless.

AYRSHIRE CATTLE.

As several readers of the *Journal* have expressed a desire for the breed-points of Ayrshire cattle, the standard adopted by the Ayrshire Cattle-breeders' Association of New Zealand is herewith published, together with a diagram illustrating the points of an Ayrshire cow, which, indeed, may be utilized in determining the desirable points of a dairy cow of any breed.

SCALE OF POINTS FOR AYRSHIRE COW.

<i>Head</i>	8
Forehead—broad and clearly defined	1
Horns—wide set on and inclining upward	1
Face—of medium length, slightly dished, clean-cut, showing veins	1
Muzzle—broad and strong without coarseness, nostrils large	1
Jaws—wide at the base, and strong	1
Eyes—full and bright, with placid expression	2
Ears—of medium size and fine, carried alert	1
<i>Neck</i> —fine throughout, throat clean, neatly joined to head and shoulders, of good length, moderately thin, nearly free from loose skin, elegant in bearing	3
<i>Forequarters</i>	11
Shoulders—light, good distance through from point to point but sharp at withers, smoothly blending into body	2
Chest—low, deep and full between the back of forelegs	6
Brisket—light	1
Legs and feet—legs straight and short, well apart, shanks fine and smooth, joints firm; feet medium size, round, solid and deep	2
<i>Body</i>	13
Back—strong and straight, chine lean, sharp and open-jointed	4
Loin—broad, strong, and level	2
Ribs—long, broad, wide apart, and well sprung	3
Abdomen—capacious, deep, firmly held up with strong muscular development	3
Flank—thin and arching	1
<i>Hindquarters</i>	11
Rump—wide, level and long from hooks to pin-bones, a reasonable pelvic arch allowed	3
Hooks—wide apart and not projecting above back nor unduly overlaid with fat	2
Pin-bones—high and wide apart	1
Thighs—thin, long and wide apart	2
Tail—long, fine, set on a level with the back	1
Legs and feet—legs strong, short, straight when viewed from behind, and set well apart; shanks fine and smooth, joints firm; feet medium size, round, solid, and deep	2
<i>Udder</i> —long, wide, deep, but not pendulous nor fleshy; firmly attached to the body; extending well up behind and far forward; quarters even; sole nearly level and not excessively indented between teats, udder-veins well developed and plainly visible	20
<i>Teats</i> —evenly placed, distance apart from side to side equal to half the breadth of udder, from back to front equal to one-third the length; length $2\frac{1}{2}$ in. to $3\frac{1}{2}$ in., and not less than 2 in., thickness in keeping with length, hanging perpendicular and slightly tapering, and free flow of milk when pressed	12
<i>Mammary Veins</i> —large, long, tortuous, branching, and entering large orifices	5



<i>Escutcheon</i> —distinctly defined, spreading over thighs and extending well upward	1
<i>Colour</i> —red of any shade, brown, or these with white, mahogany and white, black and white, or white; each colour distinctly defined	2
<i>Covering</i>	6
Skin—of medium thickness, mellow and elastic	3
Hair—soft and fine	2
Secretions—oily, of rich brown or yellow colour	1
<i>Style</i> —alert, vigorous, showing strong character; temperament mild	4
<i>Weight</i> —at maturity, from 800 lb. to 1,000 lb.	4
Total	100

SCALE OF POINTS FOR AYRSHIRE BULL.

Head	15
Forehead—broad and clearly defined	2
Horn—strong at base, set wide apart, inclined upward	1
Face—of medium length, clean-cut, showing facial veins	2
Muzzle—broad and strong without coarseness	1
Nostrils—large and open	2
Jaws—wide at the base, and strong	1
Eyes—moderately large, full and bright	2
Ears—of medium size and fine, carried alert	1
Expression—full of vigour, resolution, and masculinity	3
Neck —of medium length, somewhat arched, large and strong in the muscles on top, inclined to flatness on sides, enlarging symmetrically towards the shoulders, throat clean and free from loose skin	8
Forequarters	15
Shoulders—strong, smoothly blending into body, with good distance through from point to point and fine on top	3
Chest—low, deep, and full between and back of forelegs	8
Brisket—deep, not too prominent, and with very little dewlap	2
Legs and feet—legs well apart, straight and short, shanks fine and smooth, joints firm; feet of medium size, round, solid, and deep	2
Body	18
Back—short and straight, chine strongly developed and open-jointed	5
Loin—broad, strong, and level	4
Ribs—long, broad, strong, well sprung, and wide apart	4
Abdomen—large and deep, trimly held up with muscular development	4
Flank—thin and arching	1
Hindquarters	14
Rump—level and long from hooks to pin-bones	4
Hooks—medium distance apart, proportionally narrower than in female, not rising above the level of the back	2
Pin-bones—high, wide apart	2
Thighs—thin, long, and wide apart	3
Tail—fine, long, and set on a level with back	1
Legs and feet—legs straight, set well apart, shanks fine and smooth; feet medium size, round, solid, and deep, not to cross in walking	2
Scrotum —well developed and strongly carried	2
Rudimentaries , (veins, &c.—teats of uniform size, squarely placed, wide apart, and free from scrotum; veins long, large, tortuous, with extensions entering large orifices; escutcheon pronounced and covering a large surface	4
Colour —red of any shade, brown, or these with white, mahogany and white, black and white, or white; each colour distinctly defined	3
Covering	7
Skin—medium thickness, mellow and elastic	4
Hair—soft and fine	2
Secretions—oily, of rich brown or yellow colour	1
Style —active, vigorous, showing strong masculine character; temperament mild	10
Weight —at maturity, from 1,200 lb. to 1,500 lb.	4
Total	100

WERAROA EXPERIMENTAL FARM.

SOME members of the Empire Trades Commission visited the Weraroa Experimental Farm on the 8th instant. They were accompanied by delegates of the Wellington Chamber of Commerce, and at the farm they met



SIR RIDER HAGGARD INSPECTING A WERAROA HOLSTEIN BULL.

a number of representatives of the agricultural and pastoral interests. The stock commended itself specially to the visitors, Sir Rider Haggard expressing the opinion that the farm might well be proud of its Holstein herd.

The best margarine is now made entirely from nut-oils and milk instead of from animal-fats, and can be retailed at lower prices than the old oleo-margarine.—*British Trade Journal*.

In the list of qualified veterinary surgeons published in our last issue the degree of Mr. A. A. Johnson, of Christchurch, was given as M.R.C.V.S. It should have been F.R.C.V.S.

MILK-PRODUCING FOOD.

PRIMROSE McCONNELL.

IN connection with the various crops of forage, an abundance of which is now available at the Ruakura Farm of Instruction, no feed seems to dominate another in the matter of milk-production. A balanced food has produced no more milk than a one-sided one. What seems to be required most is an abundant supply of succulent palatable food. Of all plants grown at this station (lucerne excepted) none is so much relished as maize. It has been found that when a full ration of green maize and peas is given, the cows eat the maize and reject the peas; while, on the other hand, horses eat a pea ration greedily. It has also been found that an addition of 2 lb. of bran to the forage ration increases the milk-yield by about a gallon per week. The present lucerne-paddock being a long way from the dairy, the feeding of this plant in the green state to dairy stock was not tested, but its value is too well known to need further proof.

IMPORTATION OF DOGS FROM UNITED KINGDOM.

It has been decided by the Government to reduce the period of quarantine to sixty days of dogs imported into New Zealand from the United Kingdom, dating from the time of removal of the animal to the quarantine-station. This concession, applying only to dogs coming from the United Kingdom, is subject to the furnishing by the shipper of a sworn declaration to the effect that the animal has been domiciled in the United Kingdom for not less than nine months (or, if under nine months of age, from birth), and that it is his belief that it is free from disease, and has not during the preceding nine months been in contact with any dog suffering from disease. The last portion of the declaration must be certified to by a qualified veterinary surgeon practising in the immediate neighbourhood of the dog's domicile.

In addition to the shipper's declaration, the usual certificate issued at the port of shipment by the Veterinarian acting for this Government must also be obtained.

Both declaration and veterinary certificate must accompany the animal to New Zealand.

LUCERNE ENSILAGE.

IN the month of December, 1911, a stack of ensilage was made from lucerne at the Moumahaki Experimental Farm, nothing being mixed with the lucerne for the purpose, though at the time there was a good proportion of sow-thistle growing in the crop. It was impossible at the time to make hay, owing to the very unfavourable weather; indeed, the silage was made in practically continuous rain. The stack, weighted merely with earth, was not disturbed till January of this year. When opened it was found that the material was as green as when stacked, while the aroma was excellent. Stock took it very readily, and it provided excellent succulent fodder in the dry months of the season. The weight of silage per cubic foot was 60 lb.



STACK OF LUCERNE ENSILAGE AT MOUMAHAKI EXPERIMENTAL FARM.

RUAKURA RUST-RESISTANT OAT.—Reporting on the progress of the Marton experimental plots, the *Farmers' Union Advocate* says, "The experiment where two or three rows of various kinds of oats were sown together with the rust-resistant oat in the middle is very interesting. It is not, however, very convincing, because there is so little rust on any of them. There is scarcely any on the Algerian, none on the rust-resistant, and little on any of the others. A friend who has just visited Moumahaki Farm says that a similar experiment is being tried there, and the result is very marked. Rust is bad on nearly all the others, whereas Green's Ruakura oat does not show a speck. This is very satisfactory, and if it proves a better-looking oat than the Algerian will be of great value. Curiously enough, the Ruakura oat is ready for cutting, whereas the others are all green."

SERIOUS DANGER TO NEW ZEALAND CHEESE INDUSTRY.

THE following circular letter by Mr. D. Cuddie, the Director of the Dairy-produce Division of the Department, has been sent to all dairy companies manufacturing cheese :—

GENTLEMEN,—

There are several most important matters connected with the present position of the cheese industry in this country which it is desired to bring under the notice of dairy companies and others concerned.

Since the warmer weather set in this season, much too large a percentage of inferior cheese has been exported from the Dominion. Unfortunately, this faulty produce has been more in evidence in cheese from the Provinces of Taranaki and Auckland, although that from other districts has been affected to some extent.

The early shipments of this class of cheese are now being marketed in London, and cable advice has reached us within the last few days from Mr. Wright, Inspector of New Zealand Dairy-produce in London, which confirms the judgment of our officers on the quality of the produce before it was loaded into the Home-going steamers. It appears that the trade is making serious complaint about the quality of our cheese at the present time. On examination at this end much of the produce was found to be of poor flavour, such as would undoubtedly increase with age. Then, again, the body of many of the cheese was too weak for an export article.

The faults that have been complained of can safely be put down to one or more of three causes—viz., (1) inferior milk, (2) over-anxiety to increase the yield of cheese, and (3) lack of cool storage and the unsatisfactory carriage of cheese to the final port in New Zealand.

As to the need for more care in handling the milk on many farms and the thorough cleansing of all dairy utensils, much has already been written and said on the subject. The experiences of the Dairy Instructors this year prove conclusively that there is yet a great deal of room for improvement in this connection. Many of the milking-machines in use have been found on inspection to be in a deplorably insanitary state, and in some cases parts of them have had to be taken to the factories for cleaning. There is not the slightest doubt that the dirty condition of a large number of these machines is a serious menace to our dairy industry. Some are found to be so very unclean that it would be impossible for milk to pass through them without becoming badly contaminated and so spoiled as to be totally unfit for the making of good cheese. The rejection of such milk at all costs is the only effective cure for this evil, and managers of factories should be given a free hand in the matter, in the interest not only of those who deliver sound milk to the factories, but of the reputation of the particular brand and the good name of New Zealand cheese.

The attempts that are being made to abnormally increase the yield of cheese are proving disastrous, and if continued will end in heavy financial loss. No further comment on this point is necessary, as the remedy is obvious.

At the present time I believe that cause No. 3 is even more serious than the other two; at least it is certainly so for about three months of the year, when the atmospheric temperature is high. In the first place there are many districts where the transport of cheese from factory-door to grading-port cannot be considered altogether satisfactory. The long cartage which is necessary in some places is undoubtedly harmful to the cheese. As a matter of fact, in one of the most important cheese districts in New Zealand those engaged in the business are without the conveniences of a railway, with the result that the produce has to be carted long distances in road wagons. Then, even in places which are conveniently served by a railway, there is at times a scarcity of proper closed-in vans for conveying cheese to the shipping-port, with the result that open trucks covered with taupaulins have to be used for the purpose.

The present position of affairs is greatly accentuated by the fact that the cheese industry has expanded so rapidly and to such dimensions as to have quite outgrown the facilities provided for the proper handling of the produce at some centres. The cool-storage accommodation available is altogether inadequate, and where it is provided in some cases it is not taken advantage of as fully as might be the case.

This season already—up to the 20th February last—some 20,407 tons of cheese have been exported from New Zealand, which is an increase of 30 per cent. on last year's figures for the same period. Surely, then, the value to this country of a trade of such dimensions would warrant the provision of proper cool stores wherever quantities of the produce have to be collected!

At Auckland and New Plymouth such stores are provided, although in some cases dairy companies have failed to make use of them, while at Patea the volume of cheese handled is so great that it is absolutely impossible for the freezing-works to store it all in cool chambers. At the Bluff no attempt is made to store the cheese at all, notwithstanding the fact that the industry has grown enormously in Southland during the last few years. It is true that a new cheese-store is being erected in Wellington; but, unfortunately, arrangements are not at present being made for controlling the temperature of it. Large quantities of cheese from both North and South are centralized in Wellington, much of which is carried to this port in steamers provided with absolutely no means of cooling the holds; and with such a valuable product as cheese this should be tolerated no longer. At present during the busy season thousands of tons of cheese are collected in the Wellington Harbour Board's sheds and held at ordinary temperatures while awaiting shipment, and in many instances it has been found that cheese bearing a first-grade stamp had deteriorated to second grade in quality before being placed on board the ocean-going vessels.

Although during the last few years many of our dairy companies have spent large sums of money in building up-to-date curing-rooms for their cheese, in which the produce is protected from excessive heat and the temperature maintained at a degree which gives the best results in the curing of cheese fresh from the hoops, it is a most regrettable statement to

have to make, although a true one, that in many instances the benefits derived from these places are being nullified by the treatment received by the cheese before finally leaving the Dominion.

The defects in the present arrangements, as outlined above, are most harmful to the industry, and steps should be taken immediately to alter the existing condition of affairs. Cheese is frequently loaded on to the oversea steamers in an unsatisfactory state owing to the want of proper cool-storage accommodation, and such produce must be some distance on the voyage before this unwanted heat becomes extracted. The time has come when all cheese shipped from the Dominion should be handled in exactly the same way as butter intended for export—that is to say, it should be in a proper cool store for at least four clear days prior to shipment, while all cheese from coastal ports should be carried in steamers having mechanically cooled chambers.

The question of proper cool storage and better transport arrangements for cheese is without doubt a most pressing one; in fact, the existing lack in this connection is by far the weakest point in the industry to-day. The matter is one which calls for the attention of every cheese-making dairy company and cheese-factory proprietor in the Dominion, and it will require united action to bring about the improvements needed.

Damage to cheese of the nature mentioned above affects the Dominion as a whole; and now that New Zealand is one of the leading cheese-exporting countries of the world, the matter cannot be ignored without heavy and continued loss to the producers of this Dominion.

Yours faithfully,

D. CUDDIE,

Director of Dairy-produce Division.

SANDON RYE-GRASS.—It is satisfactory to know that Sandon rye-grass of this season is of first-grade quality, both as regards bushel weight and germination. Sandon rye-grass can once again take its place among the best types of rye-grass produced in New Zealand. Farmers are particularly warned in buying Sandon rye-grass to insist on having 1913 seed. There is almost certain to be a considerable quantity of 1912 seed held over, much of which, owing to unfavourable harvest conditions, is of such an inferior nature that its use even at a cheap rate is an expensive proposition.—*A. H. Cockayne.*

While the imports of beef for the past year into Great Britain show a large increase, those of mutton are less. The total quantity of mutton imported was 5,021,529 cwt., against 5,330,070 cwt. in 1911, and 5,405,923 cwt. in 1910. Moreover, the Argentine, which has taken such an enormous lead in the supply of beef, has sent less mutton, her contribution having been 1,580,200 cwt., against 1,782,066 cwt. in 1911. The largest quantity has come from New Zealand, which shipped 2,165,433 cwt., against 1,981,467 cwt. Australia, on the other hand, sent 977,068 cwt., against 1,291,696 cwt.

THE HEMP INDUSTRY.

W. H. FERRIS.

UNSATISFACTORY QUALITY.

WITH many millers working for only high-point fair-grade, combined with a good percentage of diseased leaf in some phormium-areas, the quality of the fibre which reached the grading-stores last month was decidedly disappointing. This was practically confined to the Manawatu and Auckland districts. In several cases the stripping has been so unsatisfactory, thereby resulting in bruised fibre, that the hemp has only reached a common grade. Two or three Wairarapa mills have been short of water for washing purposes, with the result that the fibre has been badly stained. Consequently only a common grade could be awarded.

POOR SCUTCHING.

The most unsatisfactory feature of milling-work as disclosed by the grading of the past month has been the decidedly inferior scutching generally in evidence. Failure to scutch the fibre properly is a very serious defect, as it means that cordage-manufacturers cannot produce a twine free from lumps. The presence of these lumps in binder-twine causes the twine to break, and thereby delays reaping operations. The unsatisfactory scutching is solely due to careless work on the part of the scutcher. This defect in our fibre is undoubtedly prejudicing it in the eyes of manufacturers, especially those who have a profitable substitute available.

HAWKE'S BAY AND SOUTHERN MILLS DOING GOOD WORK.

Very little good-quality fibre came to hand from the Manawatu and Foxton mills. The best phormium has been forwarded by mills in Hawke's Bay, Marlborough, and Westland. I had the pleasure of grading 189 bales of fine-grade fibre in Hawke's Bay the other day—a beautifully stripped and prepared line from one of the cleanest and most uniform fields of phormium I have seen. This swamp is practically in its native state, there being only a few shallow drains in evidence. The leaf is therefore growing under natural conditions. There was not a speck in the leaf throughout the area, in strong contrast to the poor condition of the leaf in many of our over-drained swamps. The Marlborough hemp is generally of a very satisfactory standard. In only one case is a miller of that district turning

out a fair line, principally owing to the distance the leaf has to be carried, thereby inducing heating, which turns the leaf black and makes good dressing and colour impossible. Four or five millers have been securing a fine grade, and one miller has produced a "superior" line. The Westland mills are turning out a fibre of an excellent standard, generally reaching high-point good-fair. They have a good leaf to work with, and the milling of it is being conducted on sound lines.

SOUTHLAND MILLS WORKING UP-TO-DATE METHODS.

Southland millers are improving their methods of stripping, and, having installed automatic washing-machines, are turning out a free and good-coloured fibre, which has been commonly reaching high-pointed good-fair. One or two millers with a small output are obtaining a good-fair article under the old methods. They certainly, however, have a good leaf to work with, though this is rather on the short side.

UNSATISFACTORY TOW.

Tow is reaching the grading-stores in a very unsatisfactory condition, except in a few instances where millers are having it shaken well. Seeing there is an increasing demand for this by-product, it is most unsatisfactory to know that the quality is declining instead of advancing.

DEVELOPMENT IN THE SOUTH.

Just sixty mills have recommenced operations in Otago and Southland this season, after having been out of commission for five or six years. The output was considerably restricted during the month owing to unfavourable weather, which was also the cause of the fibre milled being of poor colour.

CANTERBURY FIBRE OF GOOD STANDARD.

The hemp being produced in the Canterbury district is of good quality. Little of it is being graded, as the bulk is being purchased by local cordage-manufacturers. Canterbury fibre is very well milled, the resulting thread being free, strong, of good colour, and well scutched. It is thought highly of for binder-twine purposes.

STRIPPER-SLIPS.

Altogether too much gum and vegetation is being left in stripper-slips. This gives the by-product a very bad colour, and thereby militates against its extended employment. In several cases millers have been packing the slips in a damp condition, which brings about a dangerous heating of the bales. Two or three lines have arrived at the grading-stores during the month in a very heated state, with the result that they had to be condemned for export.

APIARY WORK FOR APRIL.

F. A. JACOBSEN.

WITH summer on the wane and the approach of autumn bees will develop that restlessness peculiar to them. This is due, no doubt, to the lessening amount of nectar available. At this period every enthusiastic beekeeper watches carefully his stocks until Father Winter lulls these with compelling force into torpor. How different is this rest and quietude to the commotion of a few short weeks before, when millions of wings sang music and the golden harvest of honey was being transferred to the combs! The proverbial busy little bee unwillingly relinquishes work. Those which laboured so laboriously in the summer sunshine gathering what was necessary to rear the future generation did, in a few short weeks, win death as a reward, and when their wings were so worn as to make it difficult to fly they sought oblivion and crawled from their hive-entrance to die. Those remaining evidently knew the necessity to keep quiet and not exhaust themselves by fruitless labour, for they live through the cold winter months and still retain sufficient vitality to give the colony a fresh start when the flowers bloom in the spring.

So live the bees; and their pleasure is centred in industry. If a queen fails in her mission the workers plan to supersede her, and she is suffocated as soon as her rival emerges from the royal cell. They plan to increase and spread themselves over the country to gather its wealth of nectar and prevent this going to waste. Thus it is that several swarms often issue from one hive and seek fresh fields for their labours. The study of bee-culture is a charming one, and appeals strongly to those who pursue it. Every beekeeper should read "The Life of the Bee," by Maeterlinck, to fully appreciate the sagacity of these wonderful little beings.

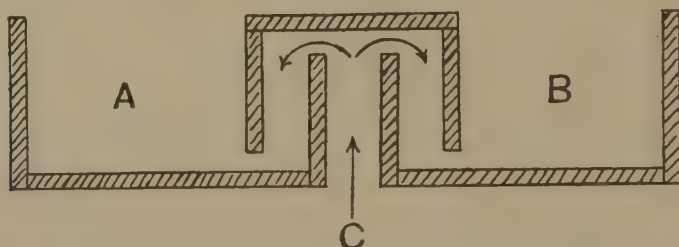
THE FEEDING QUESTION.

Colonies of bees under proper control frequently require attention in various ways, and at this period a few descriptive notes on different feeders may be helpful to those who have not seriously considered this question before. I will endeavour to explain as clearly as possible the advantages claimed for each respective feeder. The beekeeper can then decide which he should use. It is seldom necessary for those keeping only a few colonies to resort to their use, but the practical apiarist frequently finds it helpful to do something of this

kind occasionally, on account of non-productive seasons, to stimulate brood-rearing or to supply stores for winter consumption. It is always best, of course, to winter bees on sealed combs of good-quality honey. It certainly would not be wise to extract from the combs all the honey and feed sugar syrup as a substitute. This system would be foolish, yet sometimes would be preferable to leaving in the hives a very poor quality of honey, or honey-dew, which would be likely to cause severe losses through dysentery and its attendant evils. The best quality of sugar should be used, such as that bought for household purposes. Experiments have shown that this granulated kind is cheaper in the long-run than inferior qualities. It is not recommended to feed with molasses or sorghum, although some grades give fairly good results, but as a rule they are too stimulative and make the bees restless during winter. The simple method of making the syrup has been explained in a previous issue of the *Journal*.

THE MILLER.

For those who are desirous of supplying a sufficiently large quantity of provisions to last the bees right through the winter the Miller feeder would be the best. It enables about 25 lb. of stores to be fed at one time, which is a distinct advantage when a large quantity of colonies have an insufficient supply. It is made to fit completely



A AND B ARE FEED RESERVOIRS; C IS THE BEE-ENTRANCE.

over the brood-chamber and comes out flush with the super on all four sides, and the cover fits over this. Some are made to slide easily inside a super, and these are in many cases preferable, as they have a double wall to help preserve the heat in the warm syrup. They are made on the liquid-level principle, as the cross-section clearly shows.

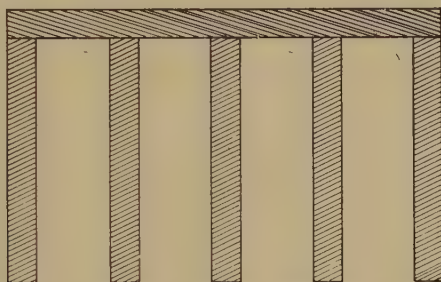
THE DOOLITTLE DIVISION-BOARD FEEDER.

This feeder is neither more nor less than a large brood-frame boarded up on each side nearly to the top. Down through the centre runs a partition nearly to the bottom. A hole is bored through the top bar, through which the feed is poured. This method of working is very convenient. The feeder may be placed right

alongside the bee cluster without disturbing the bees. When a refill is required all that is necessary is to push the cover a little to one side and quietly pour in the syrup.

THE ALEXANDER FEEDER.

The Alexander is a feeder that is very convenient, and is popular for outdoor working. It may be left under the hive the whole season, and so could be used at any time for stimulative or other feeding. It is in the form of a trough, and when the brood-chamber is pulled

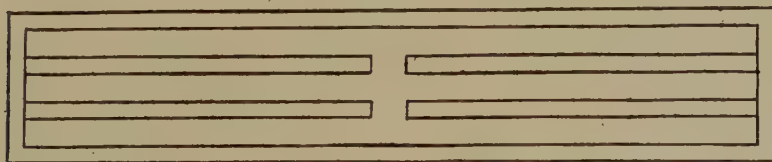


THE ALEXANDER FEEDER.

back over the end of the bottom board it is blocked up underneath, with the end protruding past the side of the brood-chamber. Over this end is placed a wooden block, which is only removed for the purpose of refilling. All work with this kind is exceedingly simple and speedy.

THE SIMPLICITY.

This feeder is most extensively used, and is simple, and cheap in price. When not in use numbers of them may be packed into a



TOP VIEW OF THE SIMPLICITY. MADE ON THE SAME PRINCIPLE AS THE ALEXANDER, BUT SMALLER.

very small space. They are good for stimulating brood-rearing, and occupy very little room on top of the frames. When flat covers are used in the apiary, however, this style of feeder cannot be adopted.

PEPPER-BOX FEEDER.

This is simply a can with a finely perforated top. When filled it is inverted and set directly over the top of the brood-frames. The

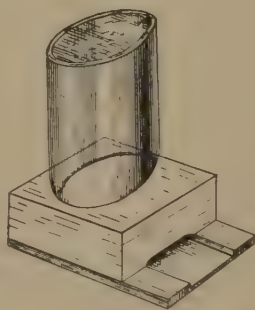
syrup slowly drains through the perforations, and is immediately sucked up by the bees.

THE BOARDMAN STYLE.

This is an entrance feeder, and makes use of the common Mason jar, which fits on to a box arrangement. The sides of the box are made to project some distance into the hive, thus guarding against robbers. A special cap is necessary for the jar, and is sold by bee-supply manufacturers, who also supply the box which completes the feeder.

The advantage with these is that one can see at a glance how quickly the bees are taking the syrup and when the jars need refilling.

It is seldom so cold in the Dominion that it is necessary to feed candy in place of syrup, but sometimes the beekeeper has been careless and finds his bees require nourishment during a cold snap. If the temperature is exceptionally low the bees may not be able to crawl away after syrup. It is, therefore, well to place a cake of candy immediately over the cluster without disturbing it, thus conserving the heat of the hive as much as possible. It will be found that the bees will eat this, and that it will probably keep them going until the warmer weather commences.



THE BOARDMAN, AS USED
WHEN ENTRANCE FEEDING.



A WELL-ARRANGED APIARY.

ORCHARD WORK FOR APRIL.

W. A. BOUCHER.

WITH the exception of the gathering and storing, or packing and shipping, of late varieties of apples and pears, the most important of the summer work in the orchard will have been completed. Still, as the time for undertaking important winter work is approaching, it would be as well to arrange for procuring such supplies of red oil, bluestone, &c., as may be required for the winter spraying.

The use of a red-oil spray for the control of mussel scale, red spider, and woolly aphis has proved very effective, as well as for the control of red spider on peaches, but it may be as well for the benefit of new subscribers to repeat a warning already given in this *Journal* with regard to the use of red-oil sprays. The winter strength should only be applied when the trees are quite dormant. To spray too early before the growth of the season has become properly ripened, especially in the case of peaches, will probably produce disastrous results.

CULTIVATION.

As the trees of most classes of fruits are now approaching a dormant condition, they will derive no further benefit from the cultivation of the soil during the current season. Soil-working in established orchards may therefore be allowed to cease for a time.

COVER-CROPS FOR ORCHARDS.

Attention was drawn in the last issue of this *Journal* to the necessity of planting at intervals a cover-crop of some kind in order to restore to the soil the humus which becomes exhausted after a period of systematic and thorough cultivation. If such a crop has not been planted earlier in the season, rape or mustard may still be sown with advantage for ploughing under in the spring. Both are hardy and will make good growth under conditions which would be altogether unfavourable to other vegetation that might be selected for cover-crops.

PLANTING NEW ORCHARDS.

There are but few districts in this Dominion where shelter from prevailing winds is not an important factor in connection with the

planting of an orchard. If shelter has not been provided, it may even be preferable in some localities to postpone the planting of an orchard for a season, set out the necessary shelter-belts, and by manuring and cultivation induce a maximum of growth, so that when the orchard-trees are planted the shelter-belts will already have become well established.

There are two periods when the planting of new orchards may be carried out—autumn and spring. Many growers prefer autumn to spring planting, but it must be remembered that in any case the condition of the soil at the time of planting is a most important consideration. In some seasons when persistent rainfall sets in early the soil becomes and remains wet and cold, just at the time when the planter has intended to set out his orchard. In such instances planting should be deferred until spring. In the meantime the trees should be heeled in, a well-drained block of land being selected for the purpose.

The preparation of the land for the planting of an orchard should be very thoroughly carried out. Intending planters should never lose sight of the fact that an orchard is intended to be practically permanent, and that mistakes made prior to planting cannot be easily rectified afterwards. Drainage is, of course, most important. In some instances tile draining to take the water away from low-lying spots may be necessary, but as much of the land that is now being planted is undulating, thus affording natural drainage, tile draining will not be required to any great extent. With few exceptions the land should be deeply worked and well subsoiled, for in districts where the rainfall is not necessarily heavy but at times persistent, even hillside land will lie very wet often for some little time if the soil has only been lightly ploughed.

STRAWBERRY-PLANTING.

The foregoing remarks with regard to the preparation of the land for an orchard apply equally well to the preparation of land for strawberry-culture, if the grower desires to secure the best possible return from his beds. The plants should be set out when the soil is moist, but in good friable condition. In some districts the month of April is the most suitable time for planting, in others the month of May. As in many localities the strawberry is very subject to attack by leaf-spot (*Sphaerella fragariæ*), during the winter months it is advisable to spray the young plants soon after they have become well established with the Bordeaux mixture, summer formula.

VINEYARD WORK FOR APRIL.

S. F. ANDERSON.

MARCH and April are busy months with the winemaker. Provided the good weather continues the Pinots (Gris, Meunier, and Noir) and Golden Chasselas will be ripe this month, followed by Malbec, Shiraz, Pinot Chardonay, Carbenet Sauvignon, Pedro Ximenes, &c., a little later.

It is no new statement to make that ripe grapes contain all the elements for making a sound and good-keeping wine, provided the utensils used are clean and the methods employed are such as one would expect in making an article for consumption.

Every winemaker should be provided with a saccharometer, to enable him to tell the saccharine-content of the grapes. Any grape showing up to 20 per cent. by this instrument will make a wine that will keep—that is, a good dry wine. Many kinds of grapes will in a dry season exceed this, such as the three Pinots above mentioned, Pedro Ximenes, Shiraz, &c., but they must be quite ripe. Rainy weather and the depredations of birds very often cause the vine-grower to commence the vintage before the fully ripe stage is reached. It is, however, doubtful whether the loss by birds and rain is as great as the loss in quality of the wine by gathering the grapes too soon. The making of wine from grapes thoroughly ripe is simple, rapid, and every way satisfactory in our climate, compared with that of making wine from grapes insufficiently ripened, and where sugar has to be added to the must to bring up the saccharine to the normal requirements. In the case of the former fermentation is over in from forty-eight to seventy-two hours, in the latter it may last a month.

Where the quantity of grapes is not large—say, from 1 to 3 acres—it is a good plan after picking to spread out the grapes on a floor for twenty-four hours or longer, to let them cool and evaporate any moisture. If the sugar-percentage is low and a drying wind blowing, they might be left some days before crushing.

VINE-HOUSE WORK FOR APRIL.

With the exception of the late grapes, most of the vine-houses will be cleared this month. If it happens to be warm and mealy-bug

exists, an opportunity occurs for dealing with this pest by cyaniding. The usual formula may be used, but the gas can be left on all night.

The mildew may also receive a final sulphuring. A good dressing now may considerably lessen the chances of trouble next season. It happens sometimes that a new house may be very bad with mildew for the first year, and if well sulphured may not be troubled for years afterwards, but it is a safe plan to be before it in the spring with the sulphurator. Vines should now be left to grow all they will until winter—the more rampant the better, as they are recuperating after the heavy cropping and stopping of the foliage during the fruiting-period.

THE SULPHURING OF VINES UNDER GLASS.

Mildew (*Oidium Tuckerii*) may always be expected, and this grape season it has been more than usually prevalent. The most effectual remedy known for this fungoid disease is sulphur. There are only two ways in which sulphur can be applied to vines without injuring the foliage. The first is by dusting or blowing the flowers-of-sulphur direct on to the foliage and fruit, making it come in contact with every portion of the plant. The second is where a vine-house is heated by hot-water pipes. In this case the pipes may be coated with a paint made of lime-water and sulphur. The heat of these pipes will not exceed 212° Fahr., and it will probably range from 160° to 200°. Between these temperatures sulphur is slightly volatile, and is driven off and deposited in very fine particles on the vines.

Where a vine-house is heated by flues or steam-pipes the heat would be greater than 212° Fahr., and this coating of them with sulphur would cause sulphur-dioxide fumes, which is the same as burning sulphur, and is very destructive to vegetation.

The mistake of burning sulphur in a vine-house to stop mildew is rather frequently made, but always with the result of destroying foliage and fruit. A light dusting with the hand or a sulphurator soon after the leaves unfold, and at intervals up to the colouring of the berries, is the most effectual remedy known, and no harm can be done.

The new orchards around Nelson, especially the great extension about the Moutere Inlet, are looking particularly well this season. A Canadian horticulturist who recently visited the district was very much struck with the remarkable growth made this season, which was, he said, in marked contrast to the annual growth made by apple-trees in Canada. He was much impressed with the possibilities of the district from a fruitgrowing point of view.

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

For the guidance of those who may wish to grow for a special purpose some details are given regarding the time required to produce various vegetables and the probable duration or currency of the crops.

Broad Beans.—Sow in May or early in June. Gathering should begin early in November. Another sowing may be made during November. The two sowings will provide beans till April or May.

French Beans are ready for use in about sixty days from the time of sowing. The average currency of a crop is from four to five weeks. The first sowing should be made early in October, the last early in February.

Runner Beans.—Sow early in October. They take about eighty days. If the crop is kept closely gathered one sowing is sufficient.

Cabbages.—Sow on 1st April. The first of them will be ready early in November. Seed sown in spring or summer produces heads in about twenty weeks. Three sowings—1st April, 15th October, and 1st December—will provide for the year.

Cauliflowers.—Sow both an early and a late variety on 1st April. The early will be in use in November; the late will begin to come in about Christmas. Sown in spring, they take about six months to mature.

Red Beet.—The turnip-rooted varieties are fit for use in sixty-five days from sowing. The long varieties take upwards of a hundred days. Sow the first kind at the end of August and the long sorts in the middle of November.

Broccoli.—Sow from 15th September to the end of October. These may be available from May to December if the right sorts are sown.

Carrots take about a hundred days to reach usable size. Sow early in spring, and early in November for a year's supply.

Lettuce.—Sow on 1st April and transplant in spring. They are ready early in November and have a currency of about four weeks. Sow again in August to succeed the first crop, and again monthly till February. In summer lettuces are fit to cut in from ten to twelve weeks from sowing the seed.

Onions.—Sow large kinds on 1st April. They are fit for use as salading all the winter. Transplant in the spring for large bulbs,

which are fully grown early in March. Sow keeping-varieties in July or August, not to be transplanted. These should be ripe in March. Sow for pickling in November—they will be ready in March.

Parsnips may be sown from August till November, according as they are wanted, early or late. They take about 140 days from seed to a good table size.

Peas.—These take on an average about 120 days to come into use, the time varying with varieties—dwarf, medium, and tall, the last named requiring nearly 140 days. The currency of a crop is about two weeks with dwarf and medium-height sorts, but often four weeks with tall varieties.

Radish.—These are usually fit for use in about twenty-eight days from sowing. A bed may be considered good for two weeks.

Turnips.—In use about sixty days from sowing. The currency of a crop is about sixty days, except that the winter crop is fit for use till they bolt to seed in August.

The above particulars are as accurate as can be stated. It must be understood that local conditions—varying weather, quality of soil, and varieties—all exercise their influence in preventing an absolutely accurate statement. It will, however, be found reliable enough for working purposes.

Leeks may still be planted if it is thought the supply will be deficient; they will not attain large size. A little nitrate of soda will help them to get into growth quickly. Allow the plants to get a fresh start before applying the nitrate; then, on a rainy day, put about a teaspoonful near each plant. Keep weeds away from those planted earlier, and keep the soil loose about them. Soot is a most valuable manure for leeks—for almost everything, in fact. A light dusting may be given occasionally all over the surface of the soil, if that is in a proper condition. The first rain will wash the soot in. Basic slag I have found to have a marked effect on onions, so it must be good for leeks. A slight dusting over all the surface soil may be given.

Turnip-seed may be put in up to the end of the first week in April for the winter supply. Though a later date sometimes answers, there is some risk attending it; still, it must be understood that it is advisable to delay the sowing as late as is reasonable—a rule proved safe by past experience, for if sown too early the turnips get overgrown, and will not stand long enough. It is wise to sow two kinds—a white (Snowball) and a yellow-fleshed (Golden Ball or Orange Jelly). The yellow-fleshed varieties, though rather poor in flavour in summer-time, are quite excellent in winter, and usually remain firm longer than the white-fleshed varieties. Overgrowing in turnips is sometimes caused by giving them too much room. This is very likely

to happen if they are thinned to a single line. It is better to leave them somewhat crowded, several deep rather than in single line. It is surprising how well they do when crowded and the quantity a given space will produce. Market growers practise this method. It requires a little practice to know just how thick to leave the plants; it is certainly difficult to describe it.

Sow *cabbage*, *cauliflower*, and *lettuce* for the early spring crops. The cabbage selected should be one of the many early varieties. Among those commonly on the market are Early Etamps, Early York, Large York, Lamb's Earliest of All, and Enfield Market. As a small early I have found Lamb's the best of these, and would grow Enfield Market with it, or Large York in preference to Lamb's if size would be of more value than an earlier supply. Enfield Market will be in cut two or three weeks later, and is best for quantity. Two kinds of cauliflower are usually sown—one of the Early London type, and a giant kind. Some of the so-called earlies are not exactly early. Early Erfurt, for instance, is not a true early—that is, if the seed supplied is true. True earlies are somewhat precocious, and are frequently difficult to manage to prevent premature buttoning, but they provide the only opportunity to get early cauliflowers. Lettuce of any good cabbage variety may be sown. If ground can be spared to sow some in lines, to be thinned out in lieu of transplanting, they are pretty sure to be fit for use several months before those sown in beds for transplanting.

Onion-seed should be also sown about the 1st April, the time the foregoing should be sown. I will here venture a caution against sowing early in the hope of getting the produce earlier in spring. Better be a week later than a week earlier, for there is considerable danger of premature flowering if there is too much autumn weather after sowing the seed. These remarks apply to all the varieties above enumerated. Onions will mostly be harvested by now. Be sure they are thoroughly dry when stored. They keep longest when made up in strings or tied along sticks, so that they can be hung up. It is quite worth while to treat a few of the best in this way. They should be hung up where they will be dry; the cooler the place the better.

Dried herbs are often useful in winter for flavouring soups, &c. Mint, thyme, savoury, and marjoram are usually cut for drying while they are in flower, thus indicating maturity of foliage. Sage and parsley are chosen from well-developed leaves. The way to dry herbs is to tie them in fairly large bunches and suspend them from a ceiling in a dry room or shed, and pass the suspending string through a sheet of paper, which is to be allowed to droop over the bunch so as to catch dust, and thus keep the herbs clean. When they are thoroughly dry the bunches may be put in paper bags and laid on a shelf.

Brussels sprouts are frequently at this time attacked by a grey-coloured aphid, which, if unchecked, speedily puts an end to them. It is easily destroyed by syringing them with boiling water. Use an ordinary garden syringe and apply with plenty of force. Keep the ground well hoed between growing crops of cabbages, broccoli, &c. This keeps the soil open and ready for rain, and ensures that when the rainy season sets in, as it soon will, it will find the ground free of weeds and in a condition that will allow it to sink in readily. Frequent working of the ground has also some effect in checking the ravages of the caterpillar of the diamond-back moth, for when disturbed many of them drop to the ground, and if they are buried by the hoe they cannot rise again.

SMALL FRUIT.

Sow *Cape gooseberry* seed in boxes. The young plants should be pricked off into other boxes, and kept under shelter till danger of frost is past in spring. It is important that strong plants be secured for planting, otherwise the first season's crop of fruit is likely to be small.

Strawberry runners should be taken off as soon as there is moisture enough in the soil to re-establish them in nurse-beds. If the foliage on established beds is diseased, it should all be mown off, gathered up, and burned. Some authorities of repute advise that in such cases the whole plantation should be burned over. To effect this a light covering of straw is applied, unless a mulch has been employed, which may now supply material for the purpose. In any case the foliage should be cut off first, but if the bed is to be burned over there is no need to remove it. Let it dry a little and all will burn together. This appears to be a rather drastic measure, but it is said that the plants break up again with remarkable vigour. Discrimination is doubtless necessary in determining the thickness of cover to burn.

FLOWER-GARDEN.

Chrysanthemums will be showing buds. The plants should be properly secured to stakes. Growth is very rapid about this time, and if the plants are not properly secured to their supports the branches become twisted and cannot be satisfactorily lifted afterwards. If the plants have several main stems these should be spread out, not bunched up indiscriminately to one stake. It is advisable to thin the buds in most instances. No amount of thinning at this time will cause the production of large blooms, but it will increase the size and prevent overcrowding with small blooms. The object of thinning should be to reduce the number of flowers on a spray to reasonable limits, not to destroy its contour.

Anemone-plants raised from seed may, if strong enough, be planted out as soon as the soil is well soaked with rain. It is not likely to get very dry again. The class of anemone most commonly grown here is the St. Bridgid strain, double and single. *Anemone Fulgens* is a quite distinct flower, having narrow pointed petals of vivid scarlet. Being a very effective plant-flower for decorating or garden ornamentation, it is well worth growing. Tubers may be purchased. They increase fairly rapidly with ordinary care.

Sow by the beginning of next month—April—such seeds of biennial plants as may yet be held over—*Dianthus* and other things mentioned in last month's *Journal*. *Pansies* may be also sown, as these will provide the early blooms, the best of the season. Where they are appreciated they should now be sown in quantity, a number of varieties rather than many of one strain. The plants are to be kept under glass till well established after pricking off. Then put them outside till they are ready for planting and the beds are ready for them.

All the *primrose* family, which includes *polyanthus*, may be planted as soon as the ground is in a fit state of moisture. Where clumps have become matted, or the soil becomes poor, they should be lifted, broken in pieces, and replanted in well-prepared soil moderately enriched with manure.

It is not well to transplant *violets* at this time except for purposes of convenience. They seldom flower well if planted in autumn—possibly I might say they never do; still, they will flower more or less. There may be no harm in doing so in some cases, but in general and proper practice immediately after flowering in spring is the correct time. They then become established and are ready for flowering the next season. These will be dealt with in a later article.

Propagation of plants for next season by cuttings should be undertaken now. Where carpet bedding, or adaptations of it, is carried out, *iresines*, *altenantheras*, and variegated ice-plant will require to be taken before frost comes. They must be rooted under glass and kept from frost.

Verbena-cuttings will root readily in a close frame in a greenhouse. The proper wood for cuttings is young shoots that have not flowered. Take them about 3 in. long, remove the lower leaves and dibble them close together in boxes of light soil surfaced with sand, water through a fine rose, and let them dry somewhat before closing the frame.

Pentstemons of the later *gloxinia*-flowered type are very fine garden plants, quite unlike the older forms. They require renewing every second or third year or they get scraggy and worn, and the flowers

deteriorate in quality. Cuttings may be rooted in several ways and at various times. The best plan for the amateur is to strike them in the open ground in a well-sheltered and semi-shady place. Cuttings must be of unflowered shoots, 4 in. or 5 in. long, the lower two or three pairs of leaves removed, and the shoot cut squarely across just below, not through, a joint. Wait till the weather cools a bit before putting them in. The old-fashioned blue *Ageratum* can be rooted in the same way.

Shrubby *calceolarias*, meaning those that grow in the garden, can be struck from cuttings with the greatest ease if they are put in at the right time. Cuttings about 3 in. long, prepared as described for pentstemons, may be inserted in May in a cool part of the garden. Surface the soil with sand first. Every cutting will grow.

Hardy annuals of all kinds may be sown in the open ground during March and early April.

Preparations for Planting.—When the next number of the *Journal* is issued it will be time to begin general planting, therefore a few words in regard to preparation may not be out of place. It is always a mistake to begin before you are ready. When a thing is not done in its proper sequence it most frequently is never done at all. Before beginning to plant a garden it should be determined what ought to be done by way of preparation, and then do it. Maybe it wants draining. If you do not put drains in before planting, it is very unlikely you will ever do so. Draining is the first thing to attend to. If a proper fall can be secured there is no difficulty; put the drains in deep enough to be out of the reach of tree-roots. It is seldom safe to make them less than 3 ft. deep. If the subsoil is hard or of a clayey nature it is generally necessary to trench, and it is always best to do so. When trenching, keep the layers of soil in the same relative positions they now occupy—that is, keep the top on top. I have heard men argue that the top should be underneath, giving as a reason that when shrubs are planted they are not planted in the top soil. This has always proved good logic but very bad practice.

Presuming a plot of ground is to be laid out in grass, beds, and paths, then the whole patch should be trenched, thus securing uniformity of texture for rain to sink through. Beds laid out on untrenched land, unless they are specially drained, become mere water-holes. Paths left solid dam the water instead of helping it off. In countries where this kind of work is always properly done the paths are so constructed as to drain the land contiguous to them. The whole block is trenched, loose soil is thrown out of the path, pipes laid along the side, then 12 in. of rough metal and a covering of gravel. These paths are finished at a lower level than the lawn or garden; they are always dry, and are seldom weedy.

THE POULTRY INDUSTRY.

F. C. BROWN.

APRIL WORK.

APRIL is a month of the year when the pullet must be depended on for the main egg-yield. The majority of the old birds are passing through the moult, and will not lay well till the latter end of winter and in spring. Obviously the main objective at the present time is to give the pullets every opportunity to produce the dear-season egg. They should, of course, be now well settled in their winter quarters, for changing pullets from house to house after they have commenced to lay is only inviting the moulting process. They should be receiving a plentiful supply of good food, with green material in abundance. The meat ration should, where possible, be given by itself at a regular time—say, at midday; though where meat substitutes have to be fed, these can be supplied with the morning mash. It is unwise, however, to provide the same proportion of meat food to every member of the flock irrespective of the individual egg-laying capacity. I have seen a pen of six record layers ravenously eat up a 1 lb. piece of boiled liver, while an adjoining pen of six poor layers would not touch the meat. This was a repeated occurrence not only with the pens in question, but with other pens of varying egg-producing capacity. In the case cited the heavy-laying birds ate up every particle of the 1 lb. weight of liver day after day without any harmful effect, and this in face of the fact that the hot morning mash was mixed with meat-soup. The result was that they established a record in egg-yield and were in excellent condition at the end of their season of exceptional production. In feeding meat substitutes great care is necessary to guard against ill effects following the feeding of the concentrated nitrogenous material. It is not to be supposed that only heavy layers have ovarian troubles, generally the result of an over-supply of blood-meal. I have seen one of the poorest layers in a flock affected with this trouble. She had been forced to eat in her morning mash a much higher proportion of blood-meal than her nature demanded, and with the inevitable result.

Green food is always a necessary accompaniment to healthy and vigorous stock, to say nothing of the rich yolk colour always to be found where the birds have a plentiful supply of green stuff. There is nothing better than watercress. The best-looking flocks I have seen lately have been receiving liberal supplies of this cheap food material.

One man who secures a cartload of watercress a day has his pullets laying at top, and his flock in the pink of condition; his eggs have a most attractive yolk colour, and he finds the cress an excellent means of reducing his feed bill. The cress is chaffed and fed separately in troughs. It is little economies like this that go to make up the difference between profit and loss.

If eggs are to be produced in winter good feeding is imperative. It is desirable, of course, to produce them at the lowest possible cost, but this principle can be carried too far. If eggs are to be secured in heavy supply in cold weather the birds must be kept at concert pitch, and the best means of doing this is to provide the birds with an abundant supply of the most desirable foods. I have seen pig-potatoes and waste vegetables boiled up and mixed with a little pollard as a morning mash. Neither did the owner feed any animal food. He complained that his fowls were not paying although from a great laying strain. It would have been surprising had they done so. The best layer will not be profitable if she has not the necessary material from which to produce her special egg-yield. Of course, the poor layer will not be profitable if fed on the ration demanded by the bird of heavy-laying strain. It is a commonly accepted rule with all classes of stock that if the maximum results are to be secured the animal capable of it must be fed to the very best advantage. The day is gone for the argument to hold water that a fowl is too fat to lay. If she becomes fat she is not a high-type layer, for the bird capable of laying two hundred eggs or over in the season cannot be overfed, even if an ample supply of the right class of food is always before her. Of course, her natural tendency to lay eggs may be checked and her energy diverted to flesh and fat formation if she is provided with the wrong class of food—with a sloppy innutritious ration, instead of a balanced and concentrated diet including a safe proportion of nitrogenous material.

It cannot be expected that pullets will lay well in cold weather unless they have everything in their favour. They must be quartered in dry, roomy houses where no vermin is allowed to live. They should be also managed intelligently. Never allow them to wait about in a wet yard on a cold morning for their breakfast. Feed them in the house at all times, throwing the evening grain in litter. They will have something to scratch for in the early morning—and thus obtain the necessary exercise—in the grains of corn left from the evening meal. The scratching-quarters should be roomy enough to comfortably accommodate all the birds, so that in cold and wet weather they need not go into the runs at all; but it is not advisable to keep the layers continually confined. If the quarters are comfortable, and the birds are habitually fed and watered in them, they will only go out in

favourable weather. Of course, it is possible to keep laying birds always under cover, but I prefer to believe that the birds will be more healthy and vigorous if given every opportunity to use runs in decent weather.

ADVANCING UTILITY TYPE.

If the laying competitions have taught one lesson more convincing than another it is the important bearing of the moulting-period on profitable production. The bird that holds out longest—the most persistent layer—is the bird that is in the lead in the competitions; in other words, the first bird to moult is too often the last bird when the year's yields come to be published; and the experience of the laying competitions is being repeated on private plants all over the country. I was visiting a poultryman the other day who complained to me that his last season's pullets have not given the same yield as did those of the previous season — in fact, they were going into a deep moult. This was the second week in February. I went carefully through the flock, and noticed that a fair percentage exhibited no sign of moult—in fact, they were still laying heavily. I made the pointed remark that there were a good many birds in the flock which were worth breeding from—the best of these late moulters; but the owner disagreed with me, although he admitted that the birds in question were laying heavily, and were therefore probably among his most profitable layers. But the birds in a heavy moult had come from a particular breeder, and he therefore intended to breed from them—this notwithstanding they had no laying pedigree behind them. I am afraid this is a common mistake. If nothing is known about the laying ancestry of a fowl, she assuredly must be judged on her own performance, and there is no better rough guide to performance than the time at which she moults, and the extent of that moult.

When we speak of pedigree of performance, it must be understood that the egg-record not only of the mother but that of the mother of the father must be known. Of course, there are birds, however desirable the pedigree possessed, which fail to come up to the standard, and must be culled, for there are wasters in the purest strains ever bred. It should be also clearly understood that it is not always the best performer that is the best breeder. It is an accepted principle by all who have concerned themselves in the advancement of types in the animal kingdom that it is only the type which has been bred true to a given ideal from generation to generation which has the power to transmit desired characters. It will often be found that the medium layer, descended in the right way and built on the right lines, is the more desirable stock bird. Take the characteristics to be looked for in their respective order of merit: 1, Constitution; 2, pedigree of performance;

3, individual performance; 4, possession of utility characters; 5, trueness of type. Or, more briefly put, laying-capacity and possession of the desired constitutional, utility, and breed points. The common argument I have been met with in laying down these principles to individual breeders is, "Oh! I have had a layer, the best bird on the nest I ever saw, and she was nothing to look at either as a layer or a type of the breed." This may be true enough; but "one swallow does not make a summer." There are freaks and exceptional animals in all classes of stock, but these do not prove a principle to be wrong; they merely constitute the exception which proves the rule.

After all, it is not the single high-type individual we are after so much as a flock of them; nor even the swell competition-pen which can put up a record and which is the selected half-dozen from a flock of hundreds. The objective of the poultryman should be to breed a flock of sturdy layers of a uniform type which plainly exhibit the desired points referred to—constitution, laying-power, and breed characters. It is no easy matter to attain this ideal, and it is even more difficult to perpetuate the type when once it has been secured. Too much importance cannot be attached to constant study of the egg-yielding type, so that the layer may be distinguished at a glance. When this facility is attained all else will follow. There is a limit, of course, to all things, and if everything is sacrificed to egg-yield something will suffer. Constitution will be weakened, the size of the eggs will decline, ovarian troubles will be intensified, and the difficulty of rearing vigorous stock will be increased. The danger in improving a character by weakening another should always be kept in mind, and while aiming at the ideal laying form see that other important features are not sacrificed in the process. There is a limit to which we can go in the laying-capacity of a bird, and if phenomenal layers only are looked for, the power responsible for it will weaken with the poorer constitution which must result.

The laying competitions have done good work, but they are capable of working much harm. It is high time the chief honours were awarded to the birds producing the greatest weight of eggs in the year rather than the largest number. The consumer will soon protest against paying full market rates for miniature eggs. With the prevailing tendency I can see a revival in some of the old popular breeds, such as the original type of Minorca, by reason of the fine large eggs they produce, especially when the market value of eggs is fixed according to quality rather than on the mixed and doubtful lines sold through the city auction-rooms.

The best thing the laying competitions have done has been to expose the show monstrosities. In the earlier competitions it was proved that

the utility type of White Leghorn could lay well over two hundred eggs in the year. This fact has not been added to, while the striving after higher records has reduced the value of many strains of White Leghorns by bringing about deterioration in the size of the eggs they produce.

It should hardly be necessary to again emphasize the importance of proper feeding and careful management if a flock of laying-birds is to be made really profitable.

CONSTITUTION.

The problem of the age is the maintenance of constitution. In a state of nature constitution is effectively maintained—the strongest male selects the best breeding female by reason of brute force. With the advent of civilization and man's interference with the breeding of the animals he has domesticated, natural selection is rendered impossible, and man has not the wit nor the knowledge to mate according to nature's dictation.

The history of the domestic fowl is a striking instance. With the natural process of selection impossible, we have improved the egg-yielding capacity to such an extent that every ounce of stamina is demanded if the modern high-type layer is to continue its great artificial production without bringing about its deterioration. The fact cannot be too strongly emphasized that the greater demands we make on a fowl by way of egg-yield the greater the care we must exercise in seeing that her vigour is not impaired in the process, while we must take every means to see that she has all the care and attention (particularly in the matter of housing and feeding) which she demands if she is to produce her maximum and if her breeding-power is not to be lowered. Disease is the thing the poultryman has most to fear, and we know that the more we remove an animal from natural conditions of life and production the greater the tendency to contract disease. The best way to fight disease is by never allowing the constitution to deteriorate, and to house the birds in fresh air but draught-proof and roomy quarters, and feed them liberally with sound and suitable food. The more artificial the animal the greater the care demanded of the owner, and there is no domestic animal of a more artificial type than the New-Zealand-bred egg stamp of White Leghorn.

In many tribes of farm stock breeders have attained almost an ideal in a certain character of an animal, only to find that their life's work has been thrown away, because in the process they neglected constitution. Breeders of utility poultry stock should heed the lesson and see to it that in aiming for extreme egg-production they do not neglect the vital consideration of constitution, or the power of production without

deterioration of the animal vigour. It has been declared that the heavy-laying White Leghorn known to this country is weaker in constitution than the type from which it sprang. This is an exaggeration. While no doubt some strains are exhibiting the effect of striving for yield alone, in reduced size of fowl and egg, there are still strains in the country which retain the needed stamina with great productive power. The warning, however, is there. If we would permanently succeed we must consider something other than performance, for we can attain productive capacity at too great a cost.

AMERICAN POULTRY INDUSTRY.

According to the annual report of the United States Department of Agriculture, there were produced in America in 1912 1,700,000,000 dozen eggs, valued at £70,000,000, while the total value of the product of the hen was stated to be £114,000,000. And yet in the first national egg-laying competition held in the States and concluded on the 1st November last the winning pen only laid 160 eggs per hen.

THINGS TO BE REMEMBERED.

The male sound in wind has mostly a clear, loud crow without a broken note at the end of it.

From a breeding point of view good results can be obtained by feeding the birds on mixed whole grains night and morning.

If eggs containing dead germs have to be tested out at different periods it is obvious something is wrong with the breeding-pens.

When breeding for egg-production don't sacrifice constitutional vigour to maintain some minor quality.

Select a male with masculine qualities. The feminine male and the masculine female are undesirables.

Desired type, sound constitution, combined with laying-records, is the keynote to breeding profitable stock.

Heavy-laying birds must be fed according to their appetite. They eat what they want, and what they want is usually what they need.

Always remember that the male bird is more than half of the flock. He should be the son of healthy parents which have a pedigree of egg-laying performance behind them.

There is no better way of forcing the pullet to moult now than to give her a feast to-day and a starvation ration to-morrow. Regular attention is imperative if winter eggs are to be secured.

PASTURES AND CROPS.

FEBRUARY.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month :—

BAY OF ISLANDS.—The weather continues in a state of drought, as it has been since October, and there seems no prospect of it breaking. It has had very disastrous results on live-stock, especially dairy herds, and the factory-suppliers are in consequence complaining of small cheques. Grass and bush fires are raging in many parts of the district, doing serious damage, and causing the winter outlook for live-stock to appear very gloomy, with the result that prices at the last monthly sale were considerably affected. Every settler in the district is praying fervently for the heavens to pour forth their watery blessings.—*W. J. Dunlop.*

AUCKLAND.—The February month, from every point of view, was all that could be desired. The fine warm weather experienced allowed the farmers time to harvest their crops in splendid condition. The dry weather, though retarding growth, was, at all events, of benefit in giving the land a spell for a time. When the late rains set in they very soon freshened up everything again. Grass, turnips, mangels, maize, and other crops benefited by the change. Stock of all descriptions are looking well. It is noticeable that the early-autumn-sown potatoes are strong and healthy. The root crops since the change set in promise to be good. The rainfall was much appreciated by the farmers, the dry weather was having a serious effect on the supply of milk for the factories.—*R. Rowan.*

TE AROHA.—The former part of the month was very dry, and pastures and root crops suffered. The last week was showery, which has done considerable good generally, but not enough rain has fallen to soak the land. However, at time of writing there are prospects of a good fall. Owing to the continuous drought the butter-fat output has fallen considerably. The showers experienced have given the root crops a start, and with a good rainfall they ought to be good, being practically free from disease and fly. Potatoes are very good generally.—*J. L. Morris.*

CAMBRIDGE.—Hot and muggy weather was the rule for the month, some days being very oppressive. Useful heavy rain-showers fell at intervals towards the end of the month, which did much to keep the grass fresh and green, and also benefited the swedes. The latter are looking particularly well just now, and a heavy turnip crop is almost assured. Hay and grain crops have been harvested in good order.—*A. A. Clapcott.*

HAMILTON.—Rain on the 6th of the month and again on two or three days towards the latter end, which, though not enough to saturate the ground, was sufficient to benefit the pastures and turnip crops. Root crops generally are looking well, and as there is every prospect of a good autumn growth of grass there should be a good supply of feed for the winter months.—*J. Kerr.*

KING-COUNTRY.—Beneficial rains fell last month, promoting a good growth in all root crops and freshening up the pastures, and should produce good results on newly sown burnt-bush areas. Tilling is now progressing favourably in the agricultural portions of the district, preparing the land for autumn sowings.—*B. Bayly.*

NEW PLYMOUTH.—The rainfall was above the average last month, consequently the pastures are looking very green, and feed is very plentiful. All root crops have made excellent growth.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—A fine growing month—fine days interspersed with rain, which has had the effect of keeping pastures and crops fresh. Meadow hay and oaten hay have been well saved. Farmers are now starting to use their maize, and the milk-supply is keeping up well. Farmers who left the sowing of their turnips till late in the season have patchy crops, these being attacked by diamond-back moth. At present the prospects for winter feed are good.—*Austin F. Wilson.*

HAWERA.—Rain fell on the 18th, after which the weather was showery and unsettled. Pastures are making a good recovery, and turnips, mangels, carrots, and other green crops are making excellent growth since the rains set in. Swedes are, so far, free from blight, but rot has appeared in a good many turnip crops of the soft varieties. The small areas of potatoes grown are yielding well, the tubers being sound and free from blight. All classes of stock are in good condition. Supplies at factories are still good, although a rapid falling-off must naturally soon be looked for.—*A. J. Glasson.*

MANGAWEKA.—Very warm weather was experienced during the early part of February. On the 21st instant a fair amount of rain fell, which was wanted to freshen up pastures and other crops. There is still an abundance of feed, and future prospects for farmers in this district are bright. Considering the dryness of the month, stock of all kinds are doing well.—*J. A. Melrose.*

POVERTY BAY.—The weather during February was exceptionally dry. Pastures of low-lying and coastal country are parched and scanty. On the higher bush land they are rather better, but large areas have been destroyed by very severe bush-fires, which swept away timber and grass. Numbers of sheep perished in the flames and smoke. In two instances the number is reported as high as 11,000 and 12,000. However, the ultimate benefit will more than repay the present loss, as a great area of very dirty country has been cleaned of rotting timber.—*William Ross.*

WAIROA.—Weather during the February period was very hot and dry, there being but two light rainfalls throughout the month. The root crops are showing the effects of the lengthened dry spell. There is still a sufficiency of feed on the hills, but the shortage of water is being seriously felt by the stock. The potato crop is not up to former standards, but the maize crop promises to yield well. Stock continue in good condition.—*T. F. Mullaly.*

WAIPIKURAU.—A very dry month. Bush and grass fires have done considerable damage, some settlers being left without any feed for stock. Houses and sheds in the Piripiri, Ruaroa, and Ruamati districts were burnt. Light showers fell on the 23rd and 24th, but were not heavy enough to do any appreciable good. Stock are looking fairly well.—*H. O. M. Christie.*

PAHIATUA.—Rainfall for the month, 1.27 in. on nine days, the heaviest fall being 0.28 in. on the 23rd February. Rainfall for month, 1912, 5.02 in., on ten days. The intermittent showers and the heavy dews have done a lot of good, giving the pastures a start, also all root crops. Referring to root crops, a settler in the Pongaroa district had a half-acre of Californian thistle, which was dug last spring, and swedes sown in November. He has fully 20 tons of turnips, and not a thistle to be seen on the patch.—*T. Bacon.*

NORTH WAIRARAIA.—The past month has been favourable, both from a pastoral and agricultural point of view—showers intermixed with warm weather, which had a beneficial effect on pastures. Turnips, rape, and all green crops have improved, except where the blight has completely destroyed the crops. Factory-suppliers state that the average is well maintained. Stock of all descriptions are looking well and, if this favourable weather continues, should winter well. Grain crops, by all accounts, are going to thresh out well up to the average.—*J. S. Rankin.*

MASTERTON.—We had exceptionally hot, dry weather during last month, and the pastures are very brown. On the 15th we had a touch of winter, and the Tararuaes were capped with snow. Rain fell on the 21st, 22nd, and 23rd, but did not improve the pastures much, though it did a great amount of good to rape and turnips. All grain crops have been harvested in good condition, the yield in oats so far being from 70 to 80 bushels. This, of course, is not equal to last year, when as high as 110 bushels was obtained, and 60 to 75 bushels for wheat. The wheat has not been threshed yet. Some good crops of swedes and mangels are noticeable in the district, and there are some very good crops of potatoes practically free from blight. The Hessian fly is reported to have done considerable damage in some parts of the district. Though some of the maize crops were sown late, they are looking well and promise good yields. There are some good crops of peas in most parts of the district. Tomato crops have been badly affected with blight, and only with persistent spraying have the larger crops been saved. All stock are looking very well. I have noticed in several parts of the district a blight—Californian-thistle rust (*Puccinia suuvelensis*)—on this thistle. This prevents the thistle from seeding. Some landowners are endeavouring to spread it from one patch to the other.—*T. C. Webb.*

SOUTH WAIRARAIA.—The weather during the past month was seasonable, there having been refreshing rains, which has brought away fresh growth. Practically all

crops are now harvested, the late crops having been very much stunted through the early drought. The rape crops have not been too good this season, owing to the dry weather, except in the low-lying lands. Stock in general are looking well.—*S. C. Ivens.*

WELLINGTON.—Generally, mild hazy weather was the rule during February. Steady beneficial rains fell on several days, freshening up hill pastures, which are now good, especially on coastal runs, and winter feed is now fairly assured. Oat crops were good and were stacked in good condition. Maize and rape are looking well, also stock. Advantage was taken of the favourable weather to burn out scrubby and fern patches for regrassing. A favourable month for farmers.—*G. H. Jenkinson.*

BLLENHEIM.—February was a very dry month and very windy. Rain fell on two days during the third week; but, owing to the hardness of the ground, there was not enough to penetrate very far, and more rain is very badly needed.—*F. H. Brittain.*

WESTLAND.—The weather continues most unpropitious for this time of the year. February, which as a rule is the hottest and driest month, proved the very reverse. We had several very cold snaps from the south, and snow fell on the high country. The result, as might be expected, was disastrous in regard to haymaking, whereas, on the other hand, the growth of grass is phenomenal. Stock in consequence are looking sleek, and the deliveries to the dairy factories are, as a result, very satisfactory indeed.—*H. J. Walton.*

KAIKOURA.—The harvesting of grain crops was practically completed during the month, and the bulk of the crop was stacked in good condition. The crop as a whole is good and above the average of former years. Wind and rain laid several of the heavy crops of oats about the beginning of the month, but these were pretty well ripened, so did not reduce the yield. Turnips are coming on nicely, and promise well for winter feed. Pastures have made good growth during the month.—*William S. Goodall.*

RANGIORA.—All green crops suffered for the want of rain in the early part of last month. Aphis had attacked the swedes, turnips, and rape, but the heavy showers at the end of the month washed a good many away and revived the crops. Threshing has been going on steadily through the month, mostly from the stook; but rain stopped operations for a short period. The weather has been seasonable. Sunshine, 185 hours 35 minutes. Rainfall for month, 2.15 in.—*A. Hughes.*

LINCOLN.—With the exception of a severe north-west gale on the 11th of the month good harvest weather prevailed until the 20th, when the weather broke. It continued showery for some days, but little harm resulted to the grain then remaining in stook. On the other hand, the rains have greatly benefited green crops and pastures. Turnip crops generally are now in a very healthy condition, and rape has been freshened up. Where already threshed, white clover has yielded fairly well. Red clover promises a fair yield. The cocksfoot crop, both as regards quantity and quality, is a satisfactory one. On the higher country on the Peninsula, however, the threshing has not been completed.—*J. G. Scott.*

ASHBURTON.—Harvesting was greatly delayed through the wet weather, and the sample of grain is very shrivelled, yielding only about half of that of last year. Turnips, rape, and grass have been greatly benefited through the rain, and good autumn and winter feed is now assured. Frost cut back a lot of the late potatoes, and the heavy nor'-westers denuded a lot of the fruit-trees. The total rainfall for the month was 3.44 in., and there were 7 degrees of frost.—*C. Branigan.*

FAIRLIE.—Very dry weather was experienced during the first half of the month, crops ripening quickly and pastures being burnt up. Water was very scarce in some parts of the district. Rain came on the 20th, 3.20 in. being registered. Pastures and root crops freshened up, and there is a good prospect for the winter. A good deal of crop has been harvested and threshed, and yields are very poor. Potatoes will require to be dug at once, as the second growth has appeared.—*W. B. Manning.*

TIMARU.—The weather for the month has been very varied—a heavy north-west gale doing a lot of damage to standing grain and crop in stook, being followed by a heavy fall of rain delaying harvest-work, and a hard frost which cut down a lot of the potato crops. The pastures have a great growth of grass all through the district, and there should be good winter feed if the frosts keep off.—*J. C. Huddleston.*

KUROW.—The past month was very unfavourable for harvesting operations, owing to heavy winds. The crops received a very severe shaking before cutting, which will affect the average yield considerably. Farmers state that their crops will not pan out

so well as last year, and that the wheat is shrivelled and light. Potato crops are also reported to be poor, owing to the dry season. A large number of lambs have left the district during the month, although the slaughtermen's strike is affecting the demand for fat sheep. Heavy rains during the latter end of the month gave root crops and grass a fresh start, and the country is commencing to look green again.—*G. Reid.*

OAMARU.—The weather of last month was variable, and has changed rapidly most of the time. The harvest is now general, and farmers are finding that crops are showing very uneven yields. A bad north-west gale caused a certain amount of damage on the 13th instant, but luckily the greater part of crop was in the stook. Green crops are looking very well, and the country has derived considerable benefit from recent rain.—*W. F. Flower.*

PALMERSTON SOUTH.—During the month weather-conditions were varied, excessive heat being followed by cold wind and rain. Heavy gales about the middle of the month did considerable damage to standing crops. Total rainfall, 1.30 in., 88 points falling since the 25th, which, although hindering harvest, has helped the turnip crop greatly, and these are now looking well. Stacking is the order of the day, a few farmers having threshed. Although the crops are below the average some good samples are to be found. One farmer has threshed 78 and 64 bushels per acre of Garton autumn-sown oats. The Hessian fly has made its appearance in wheat crops, but to no serious extent.—*C. S. Dalgliesh.*

DUNEDIN.—The weather for February was most unseasonable—in fact, some of the worst on record. Gales of wind and cold rain were experienced nearly every day. The dairy-farmers have had difficulty in securing their crops of oats, which in any case are very light. The pastures, not being heavily stocked, are very good. Mangel crops are practically a failure. Turnips also, with few exceptions, are a very light crop, the dull, windy, cold weather having retarded all growth. Potatoes promise a fair yield, and blight is not showing to any extent.—*J. R. Renton.*

MOSGIEL.—The month was mild up till the 12th, when it blew a south-west gale, which did considerable damage to any ripe crops standing. The 13th was the severest day felt in the district for many years, when a south-west gale blew, with cold rain-showers, snow falling on the surrounding hills, and this continued over the next day. The oldest settlers in the district have not seen snow so low down on the Maungatua in a February before. The storm knocked the crops about so much that they can only be cut one way, thus causing delay and expense to the farmers. Early turnips are looking well, but those late sown are backward. So far they are free from blight. Mr. A. Birtles, Momona, sprayed a paddock of potatoes five times with Bordeaux mixture, and the crop is free from blight, while the adjoining crops not sprayed are blighted. Mangels are looking well, and so are all pastures. There is abundance of feed on the flat and hill country. Harvesting is in full swing, but labour is hard to get. The mills have started to thresh out of the stook in the West Taieri district.—*H. McLeod.*

MANIOTOTO.—From the 1st to the 10th fair weather prevailed, but from the 11th to the 13th heavy gales raged, doing much damage to any crops not cut. In Paerau district, crops—turnips and oats—and pastures are looking exceptionally well. Stock in general is healthy, and is in good condition.—*A. T. N. Simpson.*

CLYDE.—The weather for February was very dry. We were treated to one or two showers, but what rain there was produced no growth of any sort. Crops that were being harvested looked very well until the 13th instant, when we had a terrific gale which played havoc. The heads of some standing crops were stripped clean off, and others were blown clean out by the roots. Stacks were overturned in all directions. Turnips, rape, and potatoes are pretty well a failure owing to dry and windy weather.—*Thomas N. Baxter.*

LAWRENCE.—The weather for the month was very changeable. High winds were experienced, with snow low down on the hills, also slight frosts at night. Some almost ripe crops were severely shaken, and in some cases comparatively green ones were badly knocked about by a gale of wind on the 14th and 15th. Turnips and rape have suffered a good deal from fly and grub. Harvest is now general. The oat crop is on the light side, but wheat has withstood the changeable weather better and will be a fair crop.—*R. Barron.*

OWAKA.—The weather for February was changeable, the first half of the month being very good and the latter part stormy. Harvesting has commenced, but the crops are short in most cases, although there are some heavy crops in parts of the district.

Blight has not made much headway among the potatoes, and indications point to a satisfactory return. Turnips are looking healthy, and grass is abundant everywhere.—*R. McGillivray.*

TAPANUI.—The weather has broken and much rain has fallen, which, although interrupting the harvest, which is now in full swing, will do an immense amount of good in freshening pastures and helping along turnips, rape, and young grass. Cereals are much below the average of former years, and the oat crop is not so well filled. Barley is below the average, both in quantity and quality. Turnips have been damaged both by fly and grub, but are recovering since recent rains, and, given fair growing-weather, may yet be a fair crop.—*W. J. McCulloch.*

GORE.—The weather during the past month was most unfavourable for harvesting, being more like winter than the early autumn. Harvesting is now general, and some very good crops are to be seen in stook. The second week of the month was exceptionally rough, the gales we experienced causing considerable damage to the green crops. In some cases farmers estimate their loss from this cause at about 10 bushels per acre. Pastures are holding out well, and both the turnip and potato crops are looking well.—*B. Grant.*

LUMSDEN.—The weather for the month of February was anything but seasonable. During the first week of the month we had some nice warm sunny days, followed by a regular winter snap—very stormy, with high wind and rain, with snow on the high country—greatly interfering with the grass-cutting and doing a lot of damage to the grass in stook. During the last week of the month we have been favoured with nice warm days, allowing the farmers to make headway in cutting the wheat and oat crops. All white crops this season will be light. Turnips appear to be doing very well, and should be plentiful. Potatoes, although not dug, look well. Pastures still continue to have plenty of feed.—*W. S. S. Cantrell.*

INVERCARGILL.—The weather during February was very changeable, with a fair amount of rain. About the middle of the month we experienced high winds and heavy hail-showers, which did a considerable amount of damage to crops. Grass is getting scarce, and turnips and rape are now being fed off in some instances. Oats are now being cut, and grass is still to be seen in stook.—*J. R. Whyborn.*

OTAUTAU.—The weather for the month was wretched, and harvest has been at a standstill in consequence. Many farmers have grain in stook, but have not been able to lead it in owing to the continuous rain. The 13th of the month was one of the worst experienced for a long time, hail and rain falling all day, doing a good deal of damage to standing crops. The grass-seed harvest is proving very light. Turnips and potatoes are looking remarkably well throughout the district, and food is plentiful.—*H. F. Dencker.*

QUEENSTOWN.—The weather for the month was very changeable up till within the last week or ten days, during which we experienced fine weather. Cold winds were very prevalent, which have had the effect of retarding the fall growth somewhat, but the whole district has improved wonderfully in the matter of pastures, crops, &c., since the rains of a month ago. Harvesting is well on now, but spring-sown crops are yet to cut, and in most cases are poor.—*A. Clarke.*

PEMBROKE.—The weather during last month was very unseasonable, and harvesting operations could only be carried out with great difficulty. A considerable amount of lost time was occasioned through the almost incessant strong gales, which at times were followed by cold rain and snow on the higher country. About the middle of the month an extra strong gale was experienced throughout the district, which damaged trees and crops.—*J. A. Griffith.*

Mr. J. G. H. Moore has been appointed Honorary Representative of the New Zealand Government in Argentine. Mr. Moore may be consulted by New Zealand traders as to the financial standing and general reputation of firms in the Argentine. His address is Colle Corrientes 758, Buenos Aires.

THE FRUIT CROP.

OFFICERS of the Orchards, Gardens, and Apiaries Division report as follows on the condition of the fruit crop at the end of February:—

WHANGAREI.—Apples, medium crop; lemons, medium; nectarines, light crop; peaches, medium crop of late varieties; pears, heavy crop; plums (English), light; tomatoes, average crop; oranges, medium crop.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, good crop; lemons, crop looking well; peaches, fair crop; pears, good crop; plums (English), crop nearly over; tomatoes, nearly done.—*W. C. Thompson.*

AUCKLAND SOUTH.—Apples, good crop early varieties, light to good of late varieties; nectarines, good crop; peaches, light to good crop; pears, light crop; plums (English), good crop; plums (Japanese), crop finished; tomatoes, good crop.
N. R. Pierce.

HAMILTON.—Apples, fair average crop, ripening well; lemons, short crop; nectarines, good average crop; peaches, fair crop, ripening freely; pears, good crop; plums, rather scarce; plums (Japanese), light crop; tomatoes, fair crop; walnuts, very light crop.—*T. E. Rodda.*

POVERTY BAY.—Apples, crop below average; lemons, poor crop; peaches, good average crop; pears, heavy crop; tomatoes, good crop.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, very medium crop; nectarines, fairly good crop; peaches, good crop; pears, average crop; plums, heavy crop; tomatoes, medium crop.—*George Stratford.*

HASTINGS.—Apples, moderate; nectarines, heavy crop; peaches, heavy crop, late varieties suffering from dry weather and rust; pears, heavy crop, some varieties damaged by scab; plums (English), heavy crop, which is almost ended; plums (Japanese), heavy crop, almost ended; tomatoes, very fair crop; walnuts, good crop.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop; nectarines, poor crop; peaches, poor crop; pears, average to heavy crop; plums (English), heavy crop; plums (Japanese), heavy crop; tomatoes, average crop.—*T. C. Webb.*

NELSON.—Apples, good crop; nectarines, good crop, which is just about finished; peaches, good crop; pears, heavy crop; plums, good crop, nearly over; raspberry crop good, but now quite finished; strawberries, second crop light, and fruit small owing to dry weather; tomatoes, good crop, still picking well. The weather during the month was hot and dry until the 20th, when heavy rain fell. All fruit has come along well, and I should say is quite a fortnight in advance of last season's.—*J. H. Thorp.*

CHRISTCHURCH.—Apples, good crop; nectarines, light crop; peaches, light crop; pears, fair to good crop; plums (English), crop nearly over; tomatoes, good crop; walnuts, poor crop.—*W. J. Courtier.*

TIMARU.—Apples, light crop; pears, fair average crop only; plums (English), harvest almost completed; plums (Japanese), crop almost done; tomatoes, good crop; walnuts, good crop. Owing to the heavy toll taken by the exceptionally severe winds experienced on the 13th and 14th instant, the apple crop is exceptionally light for the district.—*A. B. Mansfield.*

DUNEDIN.—Apples, good crop, looking very well; pears, good crop; plums (English and Japanese), harvest practically over; tomatoes, good crop. The heavy winds on the 1st and 13th did considerable damage among fruit-trees, breaking down trees and blowing off apples and pears. A beneficial rain fell in Central Otago on the 20th and 21st.—*W. T. Goodwin.*

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of February:—

AUCKLAND.—Throughout the month of February large quantities of locally grown fruit were handled daily, and compared with previous months the quality is very fair. Apples and pears are of a better size now that early varieties are over, and methods of grading and packing have been considerably improved. Black-spot is still very much in evidence, but, generally speaking, diseased fruit has been reduced to a minimum. It was found necessary to issue only five warning notices in respect of diseased fruit sent to the auction-rooms. This compares favourably with the forty-six notices issued during the previous month. There was a good demand throughout the month for all classes of seasonable fruit, and prices were as follows: Apples, choice dessert 5s. to 6s. per case, medium-quality dessert 4s. to 5s. per case; pears, choice dessert 5s. to 7s. 6d. per case, medium quality 3s. to 5s. per case; peaches, choice 3s. to 5s. per 20 lb. case, medium 2s. to 2s. 6d. per 20 lb. case; nectarines, 4s. to 6s. 6d. per 20 lb. case; apricots, 4s. 6d. to 7s. per 20 lb. case; plums (English), 3s. to 5s. per 20 lb. case; tomatoes, choice 2s. 6d. to 3s. 6d. per half-case, second class 1s. 6d. to 2s. per half-case; choice forced grapes, 1s. to 1s. 6d. per lb.; second-class grapes, 5d. to 9d. per lb.; outdoor grapes, 5s. to 7s. 6d. per 20 lb. case; quinces, 4s. to 4s. 6d. per bushel.—*C. Craigie.*

WELLINGTON.—Supplies of fruit and vegetables have been very heavy during this month. There is a vast change and improvement in the grading, packing, and labelling of cases, and buyers have already noticed the improvement. The prices ruling during the month were as follows: Apples, dessert 5s. to 7s. per bushel case, cooking 3s. 6d. to 4s. 6d. per bushel case; pears, choice 7s. to 8s. per bushel case, ordinary 5s. to 6s. 6d. per bushel case; quinces, 2s. 6d. to 3s. 6d. per bushel case; peaches, choice 3s. to 4s. 6d. per bushel case, ordinary 2s. to 3s. per bushel case; nectarines, 3s. to 3s. 6d. per bushel case; plums are in short supply, and are realizing 2s. 6d. to 4s. per case; blackberries, 2½d. per lb.; cape gooseberries, 5d. to 5½d. per lb.; grapes (Lower Hutt), 6d. to 8d. per lb.; Nelson grapes, 5d. to 7d.; tomatoes are coming in freely, and the prices have eased slightly, Hutt lots selling at 2s. 9d. to 3s. 9d. per half-case, and Nelson 2s. 6d. to 3s.; cucumbers (hothouse), 1s. 6d. to 2s. per dozen; mushrooms sold at 10s. per bushel case; cabbages, choice, good demand at 4s. to 5s., others 2s. to 3s. 6d. per sack; vegetable marrows, 1s. 6d. to 3s. 6d. per sack; pumpkins, 4s. to 5s. per sack; cauliflowers, choice 7s. 6d. to 9s., ordinary 3s. to 6s. per sack; turnips (white), 2s. to 3s. per sack; swedes, 2s. 6d. to 3s. 6d. per cwt.; green peas, 8d. per peck; carrots, 2s. 6d. to 5s. per sack; French beans, 1s. 6d. to 3s. per half-sack; parsnips, 3s. 6d. to 5s. per sack; lettuce, 1s. 6d. per case; rhubarb, 3s. 6d. to 5s. per dozen; onions, £7 to £9 per ton; potatoes, £8 to £11 per ton.—*T. C. Webb, jun.*

CHRISTCHURCH.—Apples were in good supply, dessert varieties bringing from 4s. 6d. to 5s. 6d., and cooking 3s. to 4s. 6d. per case. Australian grapes, 4½d. to 5d. per lb.; New Zealand grapes, 7d. to 9d. per lb.; lemons (Italian), 22s. 6d. per case; nectarines, 2½d. per lb.; peaches, 2½d. per lb.; pears, 1d. to 1½d. per lb.; plums, 1½d. to 1¾d. per lb.; greengages, 2d. to 3d. per lb.; mushrooms, 6½d. to 7d. per lb.; tomatoes, 2½d. to 4d. per lb. Ordinary vegetables were in fair supply.

DUNEDIN.—The markets were fairly well supplied with both fruit and vegetables. Large quantities of peaches came forward, the main supplies being from Hastings. At the beginning of the month a few lines of apricots and nectarines came to hand, but the supply of this fruit is now over. Apples and pears are plentiful and in good con-

dition. In some instances more care could be taken with the packing and grading. Several warning notices had to be issued for fruit affected with scale, scab, and codlin-moth. The following list gives a fair average of the prices ruling for the month: Tomatoes (hothouse), 5d. to 8d. per lb.; outdoor tomatoes, 7s. to 9s. per half-case; choice tomatoes in crates, 6d. to 7½d. per lb.; peaches, 3d. to 4d. per lb.; plums, 2d. to 3½ per lb.; apples, dessert 6s. 6d. to 9s., cooking 4s. to 5s. per case; pears, 5s. to 7s. per case; grapes, 9d. to 1s. per lb.; apricots, 3d. to 4d. per lb.; extra choice apricots, 5d. per lb.; nectarines, 4s. per half-case; raspberries, 6½d. per lb.; cucumbers, 4s. 4d. per case; cauliflowers, 5s. to 7s. per sack; potatoes, 6s. to 7s. per cwt.; cabbages, 1s. 6d. to 2s. 6d. per sack; turnips, 2s. 6d. per sack; lettuces, 6d. to 9d. per case; peas, 1½d. to 2½d. per lb.; French beans, 2d. per lb.; rhubarb, 5s. to 6s. per cwt.; cape gooseberries, 4d. per lb.; marrows, 6s. 6d. per dozen. The shops were fairly well stocked with both local and imported fruits, which were in good condition. Practically no diseased fruit was found in shops.—*E. T. Taylor.*

BLUFF.—A large quantity of New-Zealand-grown fruit was on this market during February. Although the supply was large it was not equal to the demand, and prices were high compared with previous years at this season. All parcels arrived at the auction-rooms in good order, and the majority were well packed. A feature of the market this season was the shipments from Hawke's Bay. I noticed only one line of diseased fruit, and it consisted of Southland-grown apples affected with black-spot. A warning notice was sent to the grower. The following is a list of the average prices ruling during the month: Tomatoes, hothouse 5d. to 1s. 1½d., outdoor 4d. to 9d.; peaches, 2½d. to 6d.; apricots, 3d. to 5d.; plums, 2d. to 4½d.; pears, 2d. to 3½d.; apples, 1½d. to 3d.; grapes, 10d. to 1s. 8½d.; potatoes, 5s. to 9s. per cwt.; onions, 7s. 6d. to 9s. per cwt.; cabbages, 1s. per dozen; cauliflowers, 2s. to 3s. per dozen; cucumbers, 4d. to 6d. each; rhubarb, 1½d. to 2d.—*Robert Hutton.*

HONEY-CROP PROSPECTS.

THE Director of the Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—The honey yield on the average is good in the Auckland District, and prices are about the same as last season.—*G. V. Westbrooke.*

WELLINGTON.—Good average honey prospects in Taranaki; Wellington Province, fair; Hawke's Bay, fair; Poverty Bay, medium. The quality of the produce from the above districts this season is good, and should command an advanced price.—*F. A. Jacobsen.*

CHRISTCHURCH.—The honey season is gradually coming to a close, and the main flow of nectar is over, although the bees are still gathering a little. This should help beekeepers to get their remaining supers fairly well completed. Prices are lower than last season. I would warn all beekeepers against taking all the honey, as brood nests are found on examination in most cases to be very short of stores for winter.—*L. Bowman.*

DUNEDIN.—A fortnight of good weather has resulted in a fair average honey crop in Southland. Beekeepers are not, however, extracting bare, preferring to leave an excess of stores. In North Otago a record crop of honey has been obtained. The quality of this season's extraction is excellent, and is realizing top prices.—*E. A. Earp.*

MOTUEKA FRUIT DEVELOPMENTS.

The following figures showing the quantity of fruit exported from Motueka district are instructive. They are obtained from the Motueka Harbourmaster's returns:—

FRUIT (BUSHELS).					
1877.	1882.	1887.	1892.	1897.	1902.
3,923	7,494	5,639	19,665	15,236	48,234
					86,460
					144,086

THE WEATHER.

DISTRICT NOTES DURING FEBRUARY.

D. C. BATES.

District.

Chiefly from Telegraphic Reports.

1. Fine weather predominated during the month, and the rainfall was slight, the percentage below the average, varying from 50 to over 90 per cent. in parts.
- 2, 4. The rainfall was everywhere below the average, ranging from 16 to as much as 65 per cent., the greater portion falling as showers between the 11th and 25th. No particularly heavy rain occurred, fair weather prevailing usually, and light to moderate westerly and northerly winds. Smoke haze from bush-fires was frequent.
- 3, 5, 6. From 60 to 70 per cent. less than the average rain fell in these districts, the wet days occurring usually between the 18th and 28th. Fine and bright weather usually prevailed, although on several days smoke haze was experienced.
- 7, 8. Very little rain fell in these two districts, the month being characterized by warm and dry weather.
- 9, 10. Although hazy and cloudy skies were frequent, fair and dry weather prevailed, less than the average rain falling by about 50 per cent. An electrical disturbance accompanied with heavy rain occurred in parts on the 21st, otherwise precipitation was in the nature of showers only. Northerly winds predominated, and, with the exception of a gale on the 13th, were of little force.
- 11, 12. The departure from the normal rainfall varied greatly in all the west coast districts, some stations recording an excess and others less than the average.
13. Heavy rain fell in parts on the 21st and 23rd, but usually the rainfall was of a showery nature.
- 14, 18. Most of the rain fell between the 20th and 24th, and the total for the month was slightly less than the average. During the remainder of the month the weather was warm and dry. Electrical disturbances were experienced in parts on the 21st and 23rd.
15. About the average or slightly less than the average rainfall was recorded in this district. On the 13th a north-west storm was experienced, and heavy rain fell, but usually the wind was not of more than moderate force. Showers were frequent on the western slopes.
16. Dull and showery weather was frequent, causing a rainfall slightly in excess of the average at most stations. High winds occurred on the 13th and 17th.
- 19-22. Most stations in these districts recorded more than the average rainfall for February, owing to two days heavy rain—viz., the 21st and 23rd. The weather was changeable, with a temperature-range greater than usual. Several gales occurred during the month.
23. Weather similar to district 22, but less than the average rain recorded.
- 24, 25. Cold, changeable, and showery weather was experienced, with several days of high winds. The total rainfall exceeded the average generally, but a few stations recorded slightly below.

SUMMARY.

The most remarkable feature of the month is the number of westerly disturbances which have passed southwards of New Zealand, and though the weather has in consequence been very unsettled in the southern province, yet only one disturbance of this nature, between the 10th and 14th, enveloped the whole Dominion. Snow fell on the 13th and 14th on high levels in the South. The wireless reports received daily from Macquarie Island have thrown quite a flood of light upon this occurrence of storms in high latitudes. A cyclonic movement which passed through Cook Strait on the 21st brought heavy rain in and southwards of Cook Strait, as well as snow in Mackenzie County, and some beneficial rain also fell in the North. During the month conditions were unusually warm and sultry in the North, but also misty and foggy at times in all parts of the Dominion.



ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the *Journal*, in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question the most complete descriptive details should be furnished.

COW TROUBLE.

MR. ARTHUR BUSH, Henderson, writes,—

Could you let me know through the *Journal of Agriculture* what is wrong with my cow, and the best treatment to follow? She calved on the 29th August, 1912. Before calving she was rolling fat, and apparently in the best of health. She calved some time during the night, and in the morning when I went to see how she was I found her on her back unable to rise, seemingly unable to pass the afterbirth. I gave her a Sykes drench, and she passed the afterbirth with pieces of flesh adhering to it. For two days she was unable to stand up, and when at last she got up she was only able to stand for a few minutes. From this on she improved considerably, although she bled from the womb for a week. Her improvement continued so that she could graze as well as the other cows, but instead of thriving she has steadily got thinner. Although I have drenched her with salts on several occasions they seem to have done no good, or very little good, until now she is a walking skeleton, and is getting stiff in the joints as though she had rheumatism. I may mention that she has always had more than she can eat, and that the other animals are all fat.

The Live-stock and Meat Division replies,—

It would be impossible to say what is the matter with the cow without examining her. As she seems to have had a bad time calving, it may be that there is some womb trouble causing her present condition. She might, however, be suffering from tuberculosis. Cases are of frequent occurrence where tuberculous animals are apparently healthy and fat prior to parturition, and waste away rapidly afterwards. I am asking the Inspector of Stock for your district to visit your place and examine her.

DISC PLOUGH.—TANEKAHA TIMBER.

MR. TIEKE RATARIKI, Oreti, Raukokore, *via* Opitiki, writes,—

I would be glad if you would answer the following questions through the pages of your *Journal* :—

1. What disc (single) plough do you consider most suitable for turning over manuka-stumps up to 3 in. in diameter, using bullocks? The soil is of a light friable nature, easily brought to a fine tilth. The country is flat, but rather rough with pig-rootings.

2. Can you give me any definite information as to the lasting-qualities of tanekaha timber in the ground, used as posts?

The Fields and Experimental Farms Division replies,—

1. Disc ploughs, from the original Spalding-Robbins to those now in use, have been carefully observed at the experimental stations and on other farms, and on almost every description of land, but none has been seen suitable for turning over manuka-stumps up to 3 in. in diameter. The discs are thin; they naturally cannot withstand the strain and shock of ploughing over stumps of that size. The usual practice where timber of that size is met with is to stump it. It is probable that on the land in question the greater number of the stumps will be of smaller dimensions. These can be dealt with by a strong single-furrow mouldboard plough, provided the heavier stumps are removed.

The Orchards, Gardens, and Apiaries Division replies,—

2. There is some diversity of opinion *re* the durability of tanekaha. Personally I have seen it stand excellently. The following authentic particulars show the durability of heart-wood to be excellent: Piles driven in the Waikato coal-mines showed perfectly sound heart-wood after being down nine years. Railway-sleepers were stacked on the ground in 1865 and left there until 1873. The bottom layer was composed of tanekaha sleepers placed directly on the earth. On the stacks being removed after eight years these sleepers came through the severe trial excellently, being, with the exception of some small patches of sap-wood, perfectly sound.

DEPRAVED APPETITE IN CATTLE.—ANGORA GOATS.

MR. T. SMITH, Ihuraua, Mauriceville, writes,—

Could you kindly inform me through your *Journal* what is required for cows (three) that are very fond of licking old bones? They have access to plenty of rock-salt. The three cows are in splendid condition, and are milking well; they calved early last August. The bones are on the track to the bail, and as soon as the cows see them they (one especially) regularly run to the bones.

Angora goats: Would you also kindly inform me what country is adapted for Angora goats? Do they require any special herb? Will the nannies breed if they have not had a kid up to six-tooth, owing to a billy not being procurable? Is there any demand for Angora goats? What weight of wool do they clip? When should they be shorn? Are they affected with lice or ticks, and, if so, should they be dipped the same as sheep?

The above queries are practically answered in the August¹¹ (1911) and September (1912) *Journals*, pages 165 and 333 respectively: but in regard to cows licking old bones the Live-stock and Meat Division would add the following:—

You might try in these cases daily half-ounce doses of compound syrup of iron and phosphates (Parrish's chemical food) or phosphate of lime. This last agent should be obtained from a chemist, and may be given mixed with bran and dry food. The dose is about half an ounce, given twice a day for about a fortnight. Then miss a similar period, and if the animal is no better, repeat.

BLINDNESS IN COLT.

MR. ANDREW WILSON, Hangatiki, writes,—

I have a colt fifteen months old, which was castrated three months ago, and was found to have gone blind in both eyes about three months after the operation. His eyes were bulged out as if there was a great pressure behind them. The tension does not seem to be so great now, but the animal is still stone blind. Perhaps some of your many readers, or some of your able officers, may know of a similar case, and will know what chance there may be of a recovery. I may say the colt was dealt with along with several other two-year-olds, because he was the only yearling on the place and we wanted to make one job of it. He was turned out along with the others in a sheltered paddock, but he had not been running with these colts previously, and whether they knocked him about or not I cannot say, but he showed no external wounds. The colt is in splendid health and good condition otherwise.

The Live-stock and Meat Division replies,

It is impossible to say what really is the cause of the trouble without a careful examination. The condition you describe may be due to some disease of the thyroid glands—exophthalmic goitre. These glands are two oval-shaped

bodies placed on each side of the upper part of the windpipe, and are especially well seen in thoroughbred and well-bred horses. In the disease in question they are enlarged, especially the left one. You had better communicate with the Inspector of Stock for your district, and inquire when a veterinary officer is likely to be in your neighbourhood, and ask him to see the colt.

KERRY CATTLE.—GRASSES.

MR. P. McKENNA, Ahaura, writes as follows:—

1. Some four or five years ago the Department of Agriculture imported some Kerry cattle, and I see by the report of the Manager of Moumahaki, Mr. F. Gillanders, in the Annual Report for 1908, that they were doing well, but I have not seen anything about them since. Would you kindly let me know through the *Agricultural Journal* whether they have been a success or not?

2. Would you also kindly let me know which of the two following grasses are of the best feeding-value in poor country—Yorkshire fog, or red-top?

The Fields and Experimental Farms Division replies,—

1. The Kerry cattle were maintained for some years north of Auckland. They did not, however, prove so acceptable to the farmer as other breeds of milking-cattle. They have not been continued as a pure breed.

2. Red-top is usually accepted as the more valuable of the two grasses mentioned.

HEIFER TROUBLE.

K. J., Morrinsville, writes,—

We have a two-and-a-half-year-old heifer which has partially lost the use of her hind legs. We noticed this first about six weeks ago, when the trouble was only slight, and could be noticed when running. However, she has gradually got worse, and now has difficulty in getting on to her hind legs, frequently knuckling over at the joints. She has had no injury that we know of, and has never had a calf. Could you advise any treatment?

The Live-stock and Meat Division replies,—

It is impossible to say what is the cause of the symptoms shown without personal examination of the animal. Even with this it is not certain whether a correct diagnosis could be given. It is probable that she has received an injury you are not aware of, probably in the region of the loins. If she is no better it would be as well to destroy her. You do not say whether she has recently been mated. Cases showing similar symptoms are not uncommon after service with a heavy bull.

BRONZE BEETLE.

C. W., Takapuna, Auckland, writes,—

Many of my apples this year are damaged by a dark stain or scab, sometimes extending to about one-fourth of the entire surface. I do not think it is made by the bronze beetle. Can you advise me what spray to use to cure it, and when to apply? I am sending specimens.

The Orchards, Gardens, and Apiaries Division replies,—

The apples forwarded have been attacked by bronze beetle in the early part of the season, with the result that later the fruit has cracked, and decay set in. The effectiveness of arsenate of lead for the control of the beetle can be increased by adding a small quantity of resin-solution to the mixture.

BEEKEEPING.

MR. E. DUCKWORTH, Hendley, Patoka, Hawke's Bay, writes,—

Will you please tell me which is the best month to double up colonies of bees? I also wish to know the name and address of the secretary of the Hawke's Bay Beekeepers' Association. The bees are doing exceptionally well here this year.

The Orchards, Gardens, and Apiaries Division replies as follows:—

March is about the best time for doubling up your colonies, which should be done in the following manner: Kill the queen in the weaker hive of the two you wish to unite, then place a single sheet of newspaper between the supers of the two colonies. In a short time the bees will gnaw through the paper and unite peacefully. The Hawke's Bay Beekeepers' Association is now non-existent, but the secretary used to be Mr. Currow, Health Food Depot, Napier. There are beekeepers' associations at Pahiatua and Gisborne.

WEATHER AND MILK-TEST.

MR. E. W. NEWTON, Mokotua, Southland, writes,—

Would you kindly inform me through your *Journal* if the weather-conditions have any effect on milk in regard to testing: if, for instance, a cold snap following a spell of mild weather would have the effect of bringing the test down, although the cows gave less milk during the cold spell? Also, if a continued spell of cold, wet weather would have the effect of keeping the test down, even though the quantity of milk comes down considerably also. To quote a case: The daily quantity of milk of one supplier dropped from about 40 gallons to about 30 gallons in about a fortnight, yet the test during that period was 0.5 lower than for the preceding period, though one would naturally expect it to be higher. Would the cold weather account for this?

The Dairy-produce Division replies,—

Weather-conditions frequently have a very marked effect upon both the quantity of milk given by a cow and its percentage of butter-fat. The amount of milk, as well as its butter-fat test, may be reduced as the result of very cold or very hot weather, or through many other causes. Some cows are affected to a greater extent than others by variations in the weather. The variation you quote is quite common—in fact, much greater variations are experienced by dairy-farmers, up to even 1 per cent, and over in some instances. In actual experience it is found that the fat-percentage in milk rises and falls at times without any apparent reason.

ORCHARD QUERIES.

MR. R. S. LEVESQUE, Cambridge, *via* Goodwood, writes,—

There are three things I would like to know about:—

(1.) The best mixture of manures to make for gooseberry-bushes. (I had thought of mixing slag and kainit in equal parts.)

(2.) The best method of pruning. If I summer-prune, shall I have to prune again in the winter?

(3.) Would you advise me to spray with the Bordeaux mixture or sulphur spray?

The Orchards, Gardens, and Apiaries Division replies,—

(1.) A dressing at the rate of 3 cwt. to 4 cwt. per acre of basic slag, to be followed in early spring by a dressing of superphosphate at the rate of 2 cwt. per acre is recommended.

(2.) Fruit-trees benefit by both summer and winter pruning.

(3.) The Bordeaux mixture has proved a very effective spray for the control of fungus diseases, and on the whole less likely to injure foliage than the sulphur spray.

MIXING OF FERTILIZERS.

"FARMER," "The Pa," Cambridge, writes as follows:—

Would you kindly inform me through the *Journal* whether there would be any chemical loss through mixing superphosphate and carbonate of lime in equal parts? Would this be a slow- or quick-acting mixture?

The Agricultural Chemist replies,—

When mixed with carbonate of lime superphosphate will be reverted to a form insoluble in water (dicalcic phosphate). The resultant mixture is slower-acting than superphosphate, but quicker-acting than guano or rock phosphate (tricalcic phosphate) on most soils.

FERTILIZERS.

MR. FRED. H. WHITE, Tahuna, writes,—

In a recent issue of the *Journal* (September number, page 339) you compared Christmas Island guano and basic slag, in answer to a question from one of your readers, and it was most interesting. Would you state the relative solvency of bonedust, Christmas Island guano, Surprise Island guano, Malden Island guano, Ocean Island guano, and Seychelles guano? Are any of these guanos more easily dissolved than others, and, if so, which? I have used these guanos with good results on newly-broken-up scrub land.

The Agricultural Chemist replies,—

Bonedust cannot be compared with guano, as it contains a quantity of intimately mixed organic matter, which affects the subsequent fate of the phosphates in the soil. The guanos can all be compared from a knowledge of the total phosphoric acid in each, the solubility in solvents being similar.

SEEDSMEN.

"DARWINIAN," Karamea, writes,—

Will you kindly give me the addresses of Messrs. Sutton and Sons and Messrs. Webb and Sons, English seed-merchants, in the next issue of your *Journal*.

The Fields and Experimental Farms Division replies,—

The following are the addresses asked for: Messrs. Sutton and Sons, Reading, England; Messrs. Webb and Sons, Wordsley, England.

BLACKBERRY-SPRAY.

MR. WILLIAM T. BELL, "Woodlands," Clevedon, writes,—

What material is used for spraying blackberry on the railway-line sides near Auckland? Is it poisonous to stock, how is it applied, and in what quantities? Could it be sprayed on with the ordinary knapsack spray-pump?

The Fields and Experimental Farms Division replies,—

The material used by the New Zealand railways for spraying blackberries on the railway-line near Auckland is known as "Pinch's gas-tar." It should not be dangerous to stock, as they usually avoid tar. The mixture is applied with a watering-can, being too thick for distribution through a spray-pump. It is applied as received from the vendors, undiluted. This specific kills for only one season. Some gorse was sprayed this season with this mixture, and the Inspector who witnessed the spraying reports that a new growth has already commenced. The following

is a recipe also used by the Railway Department—this also is a season killer: 80 lb. arsenic dissolved in 200 gallons of boiling water. Add 200 gallons cold water. This makes a 2-per-cent. solution. Weeds are first cut down by hand and the solution is sprayed on in two applications. 400 gallons of the solution is sufficient to spray twice a quarter-mile of railway-track 12 ft. wide.

INOCULATED SOIL.

MR. K. W. DALRYMPLE, Parewanui, Bulls, writes as follows:—

Would soil that has had lucerne growing in it for the last five years be inoculated? Although the lucerne has been growing well, it is being smothered out with rank grass, and is now rather thin. Can it be found by testing whether the soil is inoculated?

The Fields and Experimental Farms Division replies,—

It is accepted that soil from a lucerne-field planted five years ago would contain sufficient organisms to ensure inoculation. The presence of considerable numbers of tubercles or nodules on the roots would be a sufficient indication.

FAT-HEN.

MR. T. E. MAUNSELL, Carterton, writes as follows:—

Would you kindly advise me through your columns of the most effective method of eradicating fat-hen. I have some area of rich alluvial soil infested with the weed, and find it gives no end of trouble. I have some lucerne planted in part of it, which is growing strongly, but honours are about equal at present between it and fat-hen. The latter I am endeavouring to keep from seeding by periodical mowing. The rest is in maize and mangels.

The Fields and Experimental Farms Division replies,—

The control of the weed fat-hen can be obtained by repeated cultivation, or possibly by the use of covering-crops, such as rape, swedes, or peas in drills, that are kept free from weeds until the crop is so well advanced that the foliage will thickly cover the ground. Periodical mowing is the usual control.

GOAT'S MILK.

DR. LEWIS, Medical Superintendent, Te Waikato Sanatorium, writes.—

I should be glad to learn from you the composition of goat's milk, and the proportion of the various constituents. I should also be glad if you could let me have your opinion as to its assimilability and nutritive value.

The Dairy-produce Division replies,—

The composition of goat's milk is very similar to that of cow's milk, with the exception that the fat-content is frequently a little higher, and the same may be said for the casein and albumen. Henry Droop Richmond, F.I.C., gives a comparative analysis of average goat's and cow's milk as follows:—Goat's milk: Water, 86.04; fat, 4.63; sugar, 4.22; casein, 3.49; albumen, 0.86; ash, 0.76. Cow's milk: Water, 87.10; fat, 3.90; sugar, 4.75; casein, 3.0; albumen, 0.4; ash, 0.75. Usually the milk from goats is of a somewhat strong flavour, and is not liked by users at the commencement. The nutritive value is considered equal to that of cow's milk, and some authorities even contend that it has superior qualities in this respect. A feature of this milk is that the butter-fat is very white in colour.

LONDON WOOL SALES.

THE High Commissioner reports as follows on the last London wool sale, under date of 15th January :—

The first of the series of colonial-wool sales for 1913 opened yesterday. The attendance, while good, was not equal to that at the opening of the previous series, when the number of persons present was larger than I had seen on any former occasion. However, competition was particularly animated, and all lots offered met a general and active demand. Merinoes of all classes were specially bid for, and values of this quality were slightly higher than a month ago. Fine crossbreds were also, if anything, a shade higher, but coarser qualities, light in grease, were kept at about the same price as at last sale, while heavy and inferior classes were less eagerly competed for, with the result that their values were slightly in the buyers' favour.

In the catalogues submitted yesterday there was a fairly representative selection offered for sale. Consequently it was possible to get a fair indication of the position of the market. The quantity of wool available for the present series is considerably less than a twelvemonth ago, being 134,900 bales, as against 181,500. This, taken in conjunction with the fact that trade is booming everywhere, and that woollen-manufacturers are busy and full of orders to keep them occupied for some considerable time, justifies the belief that the present high range of prices will be maintained, or that possibly they may advance. There is little to indicate a decline. The expectation of lessened supplies, together with the belief that there may shortly be a reduction of duties on wool entering America, are strong points in favour of an advance. Of course, present prices are already so high that naturally buyers may be cautious. The fact remains, however, that wool is required, and competition for all coming forward is bound to be good.

The outlook is decidedly promising. At the present moment, however, there are two factors which bear unfavourably on trade, one being a threatened strike in the woollen districts in Yorkshire and Lancashire, and the other the Balkan trouble. It is not expected that the former will develop to any extent, however, but, of course, in regard to the latter the position is more uncertain. If the dispute between Turkey and the Balkan States were settled, there would be every prospect of a further advance in values.

For the present series 33,500 bales of New Zealand wool are catalogued.

THE DOMINION'S FLOCKS.

A COMPARATIVE TABLE.

Year.	Number of Owners.	Number of Sheep.	Number of Breeding-ewes.	Percentage of Breeding-ewes.	Exported and locally consumed.	Percentage withdrawn from Flock.
1907	19,977	20,983,772	10,736,846	51.12	6,156,471	29.33
1908	20,693	22,449,053	11,244,041	50.08	6,011,587	26.33
1909	21,858	23,480,707	12,370,346	52.68	5,913,515	25.18
1910	21,522	24,269,620	12,515,380	51.07	6,544,171	26.90
1911	21,493	23,996,126	12,324,463	51.35	7,447,704	31.03
1912	21,471	23,750,153	12,277,029	51.69	6,307,398	26.55

THE DOMINION'S EXPORTS TO BRITAIN.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcases.	Lamb, Carcases.	Reef, Quarters.	Butter, Boxes.	Cheese, Orates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Orates.	Hemp, Bales.	Tow, Bales.	Kauri- gum, Cases.	Sundry.
January,	1913 166,714 1912 237,261	229,179 302,369	6,886 12,424	109,251 114,512	63,864 64,005	118,986 95,994	.. ..	329 ..	.. 7,295	6,969 6,365	2,215 1,942	4,110 3,407	6,611 carcasses pork. 59
February,	1913 326,337 1912 208,424	403,698 273,246	12,666 13,052	89,098 101,544	81,733 62,398	127,968 106,074	.. 60	.. ..	.. ..	12,520 6,831	4,295 1,615	7,973 1,056	64 carcasses pork. ..
March,	1912 324,192 1911 264,297	518,402 665,822	20,201 26,657	64,925 45,912	49,308 40,668	70,022 58,362	.. 40,276	4,980 ..	.. ..	3,832 3,650	1,352 1,563	2,644 8,982	16 carcasses pork. 2,408
April,	1912 213,178 1911 172,503	355,929 491,413	7,046 19,106	38,986 14,823	38,137 33,411	31,615 42,917	4,905 38,456	2,180 6	.. ..	5,134 9,233	1,958 1,827	4,458 2,577	.. 2,431 carcasses pork.
May,	1912 454,506 1911 204,390	744,287 377,105	32,691 20,173	1,441 995	40,535 20,732	51,833 33,033	11,157 93,854	26,569 ..	1,500 ..	11,963 7,443	2,826 1,210	6,287 7,720	.. 1,087 carcasses pork.
June,	1912 170,738 1911 214,079	287,697 448,432	24,605 15,789	558 ..	7,712 6,323	18,138 19,568	9,160 39,422	7,622 ..	2,039 14,128	5,646 4,763	1,168 525	1,213 5,528	221 carcasses pork. 2,434
July,	1912 291,097 1911 206,869	371,474 260,761	20,457 14,296	684 ..	1,255 276	16,567 14,100	44,324 29,452	23,215 ..	20,573 10,334	7,463 6,022	1,866 1,073	5,892 2,786	210 carcasses pork. 175
August,	1912 207,239 1911 66,608	157,589 110,054	10,478 3,653	559 ..	.. ..	10,409 5,260	42,580 31,976	38,802 ..	19,562 18,231	3,758 3,443	523 303	4,219 3,475	.. 203 carcasses pork.
September,	1912 44,657 1911 102,081	40,759 40,057	1,174 6,059	8,723 6,404	1,204 ..	6,671 7,390	15,742 38,151	17,363 ..	19,933 33,059	2,957 5,604	501 393	3,671 7,672	.. 220 carcasses pork.
October,	1912 51,263 1911 9,417	15,393 2,043	3,882 100	49,962 49,036	16,989 11,501	4,647 2,182	7,952 ..	64,480 ..	5,396 32,094	4,193 4,514	401 754	9,075 2,982	.. ..
November,	1912 54,175 1911 47,770	8,286 10,427	282 403	140,751 135,741	57,181 57,319	33,305 44,934	3,680 15,833	40,896 ..	13,892 16,606	9,866 7,844	1,911 2,183	5,466 3,085	.. ..
December,	1912 117,740 1911 72,192	106,310 91,965	4,774 765	119,885 109,397	66,213 46,883	44,789 54,297	5,868 ..	30,490 ..	10,070 4,366	3,816 5,719	2,613 1,364	3,686 2,708	.. ..

BRITISH PRODUCE IMPORTS.

THE QUANTITIES AND VALUE OF CERTAIN LINES OF PRODUCE IMPORTED INTO THE UNITED KINGDOM FROM ALL COUNTRIES DURING THE YEARS 1907, 1908, 1909, 1910, 1911, AND 1912.

Year.	Total Quantity imported.	Value.	From Foreign and other Countries.		From New Zealand.	
			Quantity.	Value.	Quantity.	Value.

WOOL.

	lb.	£	lb.	£	lb.	£
1907	759,237,245	32,693,011	600,830,990	25,035,998	158,406,255	7,657,013
1908	719,044,881	27,997,328	559,345,459	22,055,563	159,699,422	5,941,765
1909	803,432,548	31,886,375	626,975,398	24,850,944	176,457,150	6,935,431
1910	797,418,403	33,811,537	607,737,552	25,284,780	189,680,851	8,526,757
1911	795,091,310	33,001,622	620,970,681	25,525,611	174,120,629	7,476,011
1912	806,855,687	33,235,015	622,615,232	25,533,651	184,240,455	7,701,364

MUTTON AND LAMB—FRESH AND REFRIGERATED.

	Cwt.	£	Cwt.	£	Cwt.	£
1907	4,578,523	8,687,407	2,573,445	4,691,179	2,005,078	3,996,228
1908	4,385,771	8,140,029	2,648,165	4,687,445	1,737,606	3,452,584
1909	4,761,838	7,839,195	2,783,815	4,340,142	1,978,023	3,499,053
1910	5,405,923	9,802,858	3,301,750	5,564,685	2,104,173	4,238,173
1911	5,337,451	9,588,646	3,355,984	5,661,895	1,981,467	3,926,751
1912	5,021,529	9,698,785	2,856,096	5,142,999	2,165,433	4,555,786

BEEF—CHILLED AND FROZEN.

	Cwt.	£	Cwt.	£	Cwt.	£
1907	5,735,003	10,397,102	5,343,704	9,830,519	391,299	566,583
1908	5,631,989	10,308,380	5,284,117	9,766,780	347,872	541,600
1909	6,140,522	10,293,406	5,686,154	9,633,087	454,368	660,319
1910	7,015,498	11,745,146	6,482,668	10,947,611	532,830	797,535
1911	7,362,434	11,136,223	7,104,499	10,761,958	257,935	374,265
1912	8,014,805	13,692,059	7,752,524	13,261,613	262,281	430,446

BUTTER.

	Cwt.	£	Cwt.	£	Cwt.	£
1907	4,210,156	22,417,926	3,896,293	20,828,700	313,863	1,599,226
1908	4,211,195	24,082,537	3,989,800	22,832,326	221,395	1,250,211
1909	4,062,812	22,424,962	3,784,231	20,952,743	278,581	1,472,219
1910	4,325,539	24,493,450	3,962,865	22,492,057	362,674	2,001,393
1911	4,302,956	24,602,111	4,026,510	23,106,869	276,446	1,495,242
1912	4,005,159	24,354,193	3,656,147	22,206,001	349,012	2,148,192

CHEESE.

	Cwt.	£	Cwt.	£	Cwt.	£
1907	2,372,233	6,905,509	2,179,932	6,316,834	192,301	586,675
1908	2,306,086	6,684,203	2,041,091	5,883,072	264,995	801,131
1909	2,390,090	6,829,863	2,021,559	5,716,151	368,531	1,113,714
1910	2,456,340	6,809,876	2,002,555	5,499,326	453,785	1,310,550
1911	2,348,322	7,139,942	1,950,477	5,930,393	397,845	1,209,549
1912	2,308,799	7,414,126	1,764,882	5,531,286	543,917	1,882,840

HEMP.

	Tons.	£	Tons.	£	Tons.	£
1907	123,273	4,037,264	100,048	3,291,298	23,225	745,966
1908	111,524	2,949,648	96,057	2,539,113	15,467	410,535
1909	109,908	2,640,815	100,537	2,425,428	9,371	215,387
1910	124,003	3,031,495	106,656	2,605,762	17,347	425,733
1911	134,685	3,173,229	119,612	2,861,379	15,073	311,850
1912	144,619	3,694,675	127,839	3,327,255	16,780	367,420

HEMP AND TOW GRADING RETURNS.

FEBRUARY, 1913.

Hemp.—The total number of bales graded was 16,082, as compared with 9,291 for the corresponding month of last year, an increase of 6,791 bales. For the twelve months ending 28th February, 1913, the number of bales graded was 112,332, as compared with 85,611 for the previous twelve months, the increase being 26,721 bales.

Tow.—During the month 5,710 bales were dealt with, as compared with 2,737 for the corresponding month of last year, an increase of 2,973 bales. For the twelve months ending 28th February, 1913, the number of bales graded was 36,172, as compared with 23,235 for the previous twelve months, the increase being 12,937 bales.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF FEBRUARY, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	544	2,739	280	22	27	3,612
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	..	1,129	3,232	211	7	..	4,579
Wellington ..	..	161	2,694	2,111	122	7	..	5,095
Blenheim ..	34	90	76	..	..	..	..	200
Picton ..	..	140	40	188	..	..	..	368
Lyttelton ..	..	..	14	..	..	..	..	14
Dunedin ..	..	40	276	229	67	..	..	612
Bluff ..	..	..	295	1,279	28	..	..	1,602
Totals ..	34	431	5,068	9,778	708	36	27	16,082
Percentages of totals	0.21	2.68	31.52	60.80	4.40	0.22	0.17	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	43	637	975	128	1,783
Napier ..	..	..	..	..	..
Foxton ..	83	539	375	14	1,011
Wellington ..	317	978	285	28	1,608
Blenheim ..	34	54	..	..	88
Picton ..	23	66	41	..	130
Lyttelton ..	..	118	..	..	118
Dunedin ..	..	122	120	..	242
Bluff ..	..	262	433	35	730
Totals ..	500	2,776	2,229	205	5,710

Stripper-slips.—Passed for shipment: Auckland, 76; Foxton, 509; Wellington, 707; Picton, 26; Lyttelton, 16; Bluff, 127—total, 1,461. Condemned: Auckland, 14; Foxton, 76; Wellington, 36; Bluff, 11—total, 137.

STOCK EXPORTED.

FEBRUARY, 1913.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.		Sheep.			Swine.	
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To Australia.	To Pacific Islands.	To South America.	To Argentine.	To Pacific Islands.
Auckland	2	40	..	..	22	..	214	..	..	2
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	20	..	..	..	..
Wellington	18	..	..	..	..	10	8	25	..	..
Lyttelton	2	2	..	..	..	..	..	..	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	21	..	..	..	..	2	..	..	..	..
Bluff	..	..	..	..	..	4	..	..	..	..
Totals	43	42	..	..	22	36	222	25	..	2

The following are the particulars of the horses shipped: 2 thoroughbred stallions, 4 thoroughbred mares, 6 thoroughbred geldings, 7 pony mares, 6 hacks and light-harness horses (geldings), 28 mares, 20 draught stallions, 5 half-draught mares, and 5 geldings.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of February, 1913, of agricultural and farm products :—

Item.	Quantity.	Value.
		£
Bran	Nil	..
Butter	Nil	..
Cheese	8 cwt.	51
Chaff	2 tons	14
Fruits, fresh, all kinds	2,098,497 lb.	12,017
Barley	Nil	..
Oats	6 centsals	4
Wheat	Nil	..
Onions	556 cwt.	196
Pollard and sharps	Nil	..
Potatoes	7 tons	44
Seeds, grass and clover	5,582 cwt.	18,288
Total values imported	..	£30,614

NEW ZEALAND-VANCOUVER TRADE.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since September last:—

	"Marama," 27th Sept.	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.	"Zealandia," 14th Feb.
Butter, boxes ..	4,428	9,777	5,945	11,377	10,960	5,205
Eggs, " ..	8	226	..	..	..	..
Beef, quarters ..	..	..	..	580	716	..
Veal, carcasses ..	..	..	..	393	276	181
Frozen sundries, packages ..	..	12	5	12	..	39
Wool, bales ..	..	..	6	20	30	..
Grass-seeds, beans, &c., sacks ..	..	50	177	..	..	54
Hides and skins, sacks, &c. ..	657	721	559	595	329	583
Onions, cases ..	..	..	..	..	14	1,572
Sheep-skins, bales ..	..	138	..	..	24	112
Jam, cases ..	..	125	100	50	50	75
Sundries, packages ..	5	21	329	92	313	250
Potatoes, crates ..	..	23	..	165	20	..
K a u r i - g u m, packages ..	69	46	53	21	..	176
Hemp, bales ..	..	..	..	..	246	129

BUTTER AND CHEESE EXPORTS.

THE following figures show the exports of butter and cheese from 1st April, 1912, up to 28th February, 1913, and the exports for the corresponding period of last season:—

To London.		To Vancouver.	To South Africa.	
Butter.	Cheese.	Butter.	Butter.	Cheese.
1911-12.		1911-12.	1911-12.	
275,162 cwt.	363,723 cwt.	19,708 cwt.	3,932 cwt.	2,610 cwt.
1912-13.		1912-13.	1912-13.	
259,266 cwt.	408,141 cwt.	51,847 cwt.	11,922 cwt.	4,628 cwt.

EXPORT OF EGGS.

THE experimental shipment of eggs made to the London market by the Government in December last arrived in excellent condition, and was successful in demonstrating its objective—that New Zealand eggs can be shipped successfully to distant oversea markets if carried in a cool-chamber at a temperature of about 45 degrees. The eggs met a poor market, and realized 8s. per 120 wholesale (9½d. per dozen). Reporting on the shipment, Messrs. H. C. Lane and Co., the London agents, state that the eggs when tested were found to be in splendid condition. Judging by the analysis they could be fairly described as new laid. They compared very favourably with eggs sent to Britain from Denmark and Russia. Hardly an egg in the 300 was broken. "From our point of view," the London agents conclude, "the experiment has been entirely successful."

NEW ZEALAND-SAN FRANCISCO SUBSIDIZED STEAM SERVICE.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti, and transhipments for Vancouver from New Zealand, since November last:—

	"Tahiti," 8th Nov.	"Moana," 6th Dec.	"Aorangi," 3rd Jan.	"Tahiti," 31st Jan.	"Moana," 28th Feb.
Gum, packages	..	13	..	20	20
Seeds, sacks	10	..	..	..	..
Grain, &c., sacks	61	79	343	69	324
Meats, cases	475	413	523	272	100
Onions, cases	2	3	6	52	1,759
Potatoes, sacks	20	26	11	24	2
Sundries, packages	240	562	948	126	54
Butter, boxes	8,413	7,410	5,894	7,782	7,281
Hemp, bales	393	281	173	296	282
Frozen lamb, carcasses	..	..	..	3	2
" veal	..	..	..	71	..
" beef, quarters	..	..	..	489	150
" sundries, packages	..	..	..	..	2
Timber, pieces	..	..	..	1,440	..

A COMPARATIVE STATEMENT.

THE following figures show the main lines of agricultural products exported from New Zealand and Australia during the past twelve years:—

Year.	New Zealand.			Australia.		
	Wool.	Mutton and Lamb.	Butter.	Wool.	Mutton and Lamb.	Butter.
	£	£	£	£	£	£
1901 ..	3,699,103	1,857,920	882,406	15,235,704	726,186	1,447,882
1902 ..	3,354,563	2,190,636	1,205,802	12,743,013	543,422	379,244
1903 ..	4,041,274	2,788,828	1,318,067	13,997,233	489,934	1,213,177
1904 ..	4,673,826	2,468,923	1,380,460	17,115,334	657,361	2,460,661
1905 ..	5,381,333	2,431,440	1,408,557	19,822,216	1,111,969	2,331,595
1906 ..	6,765,655	2,482,266	1,560,235	22,645,769	1,095,120	3,238,304
1907 ..	7,657,278	2,864,460	1,615,345	28,891,830	1,377,502	2,890,261
1908 ..	5,332,781	2,682,364	1,171,182	22,913,660	1,219,107	2,386,548
1909 ..	6,305,888	2,950,801	1,639,380	25,483,110	1,231,035	2,399,693
1910 ..	8,308,410	3,134,149	1,811,975	28,777,187	2,161,513	3,951,131
1911 ..	6,491,707	3,085,735	1,576,917	26,071,193	1,633,622	4,637,362
1912 ..	7,105,583	3,498,990	2,088,809	26,332,617	1,592,278	3,343,240

The value of the cheese export of New Zealand increased from £238,685 in 1901 to £1,680,393 in 1912.

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of February:—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
1	Wire-haired fox-terrier	Female	London	C. L. Thomas	Napier.
1	Ditto	Male	"	"	"
1	Red-polled Angus	Bull	"	N.Z. Loan and Mercantile Agency Co.	Auckland.
3	Shorthorn	Heifers	Sydney	Ditto	"
SOMES ISLAND (WELLINGTON).					
1	Hereford	Bull	London	E. Short	Feilding.
1	"	Heifer	"	"	"
2	Jersey	Bulls	"	J. R. Corrigan	Hawera.
2	"	Heifers	"	"	"
5	Ayrshire	Bulls	"	National Dairy Association	Wellington.
1	Southdown	Ram	"	J. Balsillie	Palmerston North.
5	"	Ewes	"	"	Ditto.
1	"	Ram	"	Ellis Bros.	Bull's.
4	"	Ewes	"	"	"
QUAIL ISLAND (LYTTELTON).					
2	Guernsey	Bulls	London	George Gould	Christchurch.
4	"	Heifers	"	"	"
1	Oxford Down	Ram	"	F. C. Herbert	Fairlie.
1	Shropshire Down	"	"	L. White	Rakata.
2	Southdown	"	"	Pyne and Co.	Christchurch.
1	Collie dog	Male	"	C. S. Hay	Wanganui.
1	Collie	Female	"	"	"
3	Collie pups (dropped on voyage)	"	"	"	"
1*	Collie	Female	London	James Lilico	Lochiel.
3	Collie pups (dropped on voyage)	"	"	"	"

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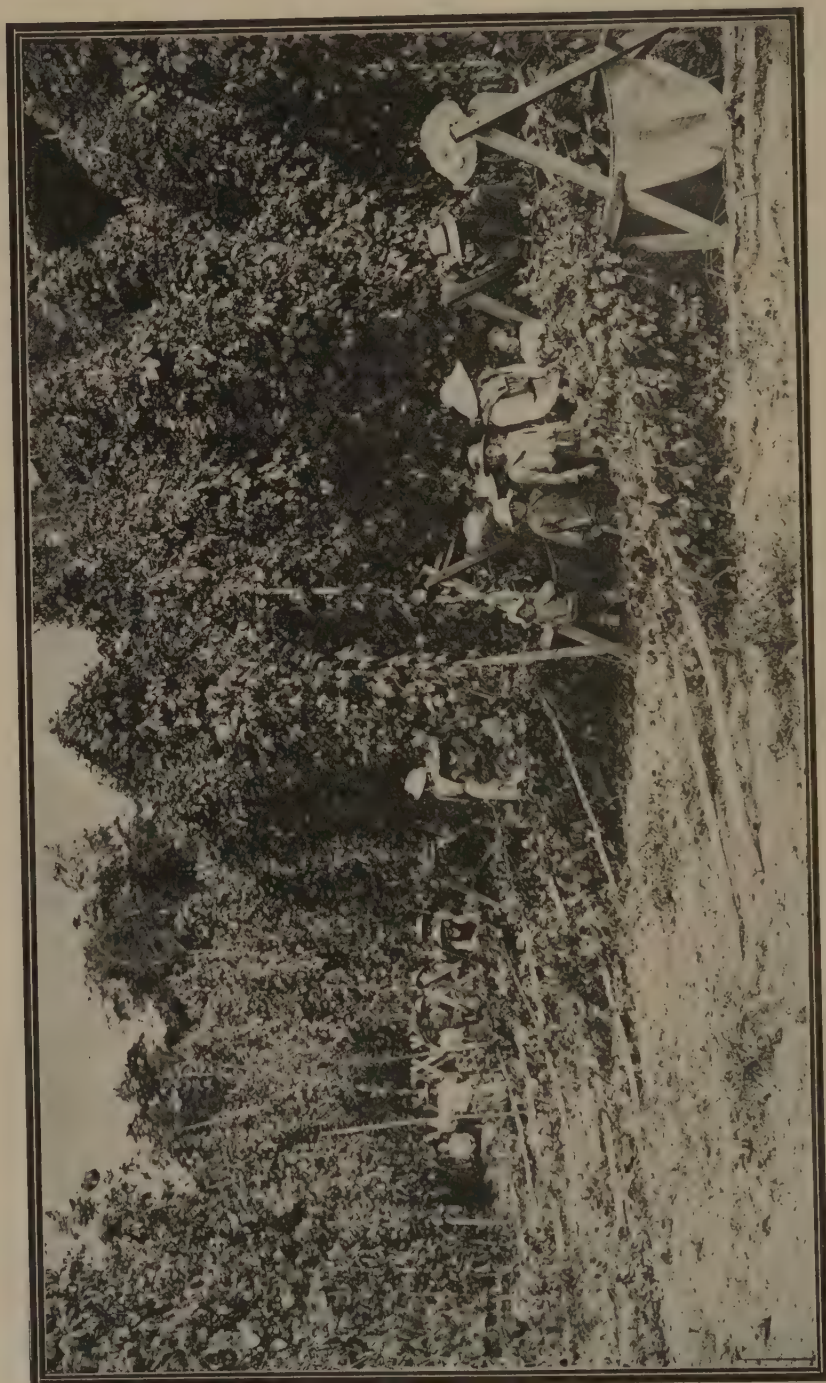
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Scene in a Nelson Hopfield.]



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PRICE,
SIXPENCE.

SHEEP - MANAGEMENT.

VIEWED FROM THE HEALTH STANDPOINT.

C. J. REAKES, D.V.Sc., M.R.C.V.S.

SHEEP-FARMING is already a great industry in New Zealand, but it has a still greater future before it. Not only is there yet much land waiting settlement capable of carrying considerable flocks, but the land already in occupation could, with improved methods of management, quite well carry more sheep than at present, and this without interfering with other branches of rural industry, as dairy-farming, &c.

One cardinal principle in successful sheep-farming is that the flocks be maintained in as sound health and condition as possible, in order that the yield of marketable products, whether wool, lamb, or mutton, may return their full share of profit to those engaged in the industry, and this can only be brought about by good management, which in turn is dependent upon the possession of good practical knowledge on the part of the farmer. New Zealand is free from any serious disease of a contagious nature affecting sheep, and such mortality as does

occur year by year is due principally to causes which are more or less preventable—though, unfortunately, in some cases the preventive measures necessary are such as to be in a degree opposed to the most advanced methods in practice and, for that matter, necessary for commercial success in sheep-farming—and in these cases the sheep-owner is faced by the proposition whether it is not better to take the risk of some possible loss rather than to accept the certain loss of profit which is entailed by taking the necessary measures to ensure the greatest possible immunity from sickness or mortality.

THE QUESTION OF ENVIRONMENT.

New Zealand is, on the whole, an excellent country for sheep-farming, much of its area constituting ideal country for it from a health point of view, but other portions, particularly in the North Island, have so copious a rainfall, so good a soil, and so plentiful a growth of herbage that sheep, unless carefully managed, are apt to suffer through life being made too easy for them. The sheep is an animal particularly well adapted for living on dry hilly or undulating country, with a sufficiency but not an excess of food, and when in such an environment a high standard of general health and vigour is maintained in the flocks. By a process of gradual natural adaptation of the character and constitution of sheep to environment—in which the principle of the survival of the fittest doubtless played an important part—followed later by careful breeding and selection, various breeds of sheep have been evolved which have become specially adapted to different classes of country, and thus animals have been produced which, given proper management, can be more or less successfully kept on land which in itself is not naturally suitable for sheep. A notable instance of this is seen in the Romney breed, whose original home was in the low-lying, marshy, alluvial tract situated in the southern part of Kent, and known as Romney Marsh. Not only is the land there low-lying and wet, but the climate is usually more or less moist, and the conditions, as a whole, are opposed to those usually looked upon as being best adapted for the maintenance of sound health in sheep. Yet the breed persisted, and has now made a high reputation for itself for its capacity for withstanding soil and weather conditions of a nature detrimental to most other breeds. Certainly the breeding and rearing of Romney sheep is not now confined to Romney Marsh alone, higher and drier country being also utilized, but the fact remains that the breed was originally evolved in this wet, low-lying area.

Within a comparatively short distance of Romney Marsh are the low chalky hills known as the South Downs, which constitute the native home of the Southdown sheep, an animal of entirely different

type, eminently adapted for its own particular environment, but unsuitable for the low-lying wet country on which the Romney sheep was developed. And so on throughout England and Scotland we see particular breeds domiciled in different districts, each largely confined to its own district and each suited to the particular soil and climatic conditions existing there. Perhaps the British farmer is at times somewhat too conservative and too parochial, so to speak, in this matter, yet the principle is a sound one and one which could be followed out in New Zealand with profit to a much greater extent than is the case at the present time. True, on many properties this principle is adopted, but often the smaller owner, who runs sheep in conjunction with other stock and with cropping, has to go to the saleyards for his purchases, and under present-day conditions he cannot always afford, when purchasing ewes, to be too particular as to breed, as he might thereby miss his chance of buying; but he can, at any rate, always do his best in this direction, and he can always secure purebred rams, and these should certainly be of the right breed for his country, with, of course, due regard for the production of wool, and of good-quality fat lambs when required. But, with the ram, breed is not the only consideration: care must be exercised to select well-furnished vigorous animals, well woolled throughout. Thus one principle of profitable sheep-farming is the maintenance of a flock bred under such conditions as to render it best adapted to the class of country and climate prevailing. Another is to take all possible steps to maintain the sheep in sound health and condition. This requires good management, and, as already stated, it is often a difficult matter to make conditions of health harmonize with commercial necessities. On poor country, be it high or low, provided it is not ill drained and wet, there is very little mortality among sheep, except as a result of extremes of weather; but on rich country considerable trouble often occurs through the feeding-conditions being really too good to a greater or lesser extent, partly according to the breed of sheep kept.

MANAGEMENT OF THE EWE.

Breeding-ewes are the principal sufferers, they being very apt, especially when carrying their lambs, to put on fat freely, to become lazy and take too little exercise, and to degenerate in health and vigour in consequence. Well-marked instances of the results of a combination of too much good feed and too little exercise are seen in two conditions occurring in ewes before lambing, and known respectively as ante-partum paralysis and ante-partum extrusion of the vagina. (See Bulletin No. 15, by Dr. Gilruth, "Two Diseases affecting Pregnant Ewes," which contains a full description of these diseases.) The first-mentioned was formerly principally met with in Canterbury and Otago, but of late

years it has been often found in the North Island also. Extrusion of the vagina is still far more common in the North than in the South Island. Both can be prevented by suitable management, and even after either has made its appearance a change to short pasture combined with a sufficiency of daily exercise is the most effectual means of stopping the trouble. The change of feed most desirable, if it be available, is to place the ewes on a paddock of short fresh-growing grass or one of young green oats, the laxative effect of this feed no doubt assisting nature in restoring the balance of the system and enabling the ewe to return to a condition of normal health. I had an interesting practical experience of this some years since. A number of stud ewes in high condition were on exceptionally good feed, and deaths began to occur. In a few days the mortality reached an average of seven or eight daily, and the owner naturally became alarmed. At his request a visit was made to the farm, and after a careful examination the cause of the trouble was determined. A change on to short pasture was advised, together with the ensuring of daily exercise by a man going into the paddock twice daily and keeping the animals on the move for an hour or so each time. The result was that after two days the mortality ceased entirely. Similar treatment has generally been found equally successful in other cases of the kind when the owner has been able to properly carry it out—not always an easy matter when a man's time is involved; but the change of pasture alone does a lot of good.

Extrusion of the vagina rarely affects ewes other than those carrying twin lambs; and with this, care in preventing the ewes coming to their lambing in too high condition, at the same time ensuring that they get a sufficiency of exercise, is of the highest value as a preventive measure, as is pointed out in the leaflet on the subject, referred to above. It is a mistake to suppose that the higher the condition of the ewe the stronger and healthier will be her lamb or lambs. The ewe most likely to produce the best and strongest progeny is the ewe in good healthy, strong condition. A ewe which is too fat is neither healthy nor strong. The time to provide an abundance of good feed for breeding-ewes is not before they lamb, but after, when they are suckling their young. Before lambing all they need is a sufficiency to keep them in good sound health and condition, but not an excess, such as would be liable to induce laziness and an accumulation of fat in the system. An instance of the efficacy of this practical and common-sense treatment came under my notice recently. A large sheepowner who had been troubled with extrusion of the vagina among his stud ewes year after year decided to try it. He brought his ewes to their lambing in a paddock of short sweet grass, and put on an old man to go among them daily, stir them up, and keep them moving round.

The result was most satisfactory, only one or two isolated cases occurring instead of a considerable number as had been the case in previous years. There is, I know, still some diversity of opinion among sheepowners as to the cause of this trouble, and this is no doubt encouraged by the fact that occasionally a case occurs in a ewe not in high condition. But occasional cases may occur from other causes, as, for instance, constipation, indigestion causing distension of the first stomach or the bowels, through the formation of gas produced by the fermentation of imperfectly masticated or improperly digested food. Retention of urine, again, caused by the muscles controlling the neck of the bladder not relaxing and allowing the urine to be passed when it should be, and consequent straining on the part of the ewe, is another very probable direct cause. But this, as with digestive trouble, constipation, &c., is far more likely to occur in a fat lazy ewe than in one in less high condition.

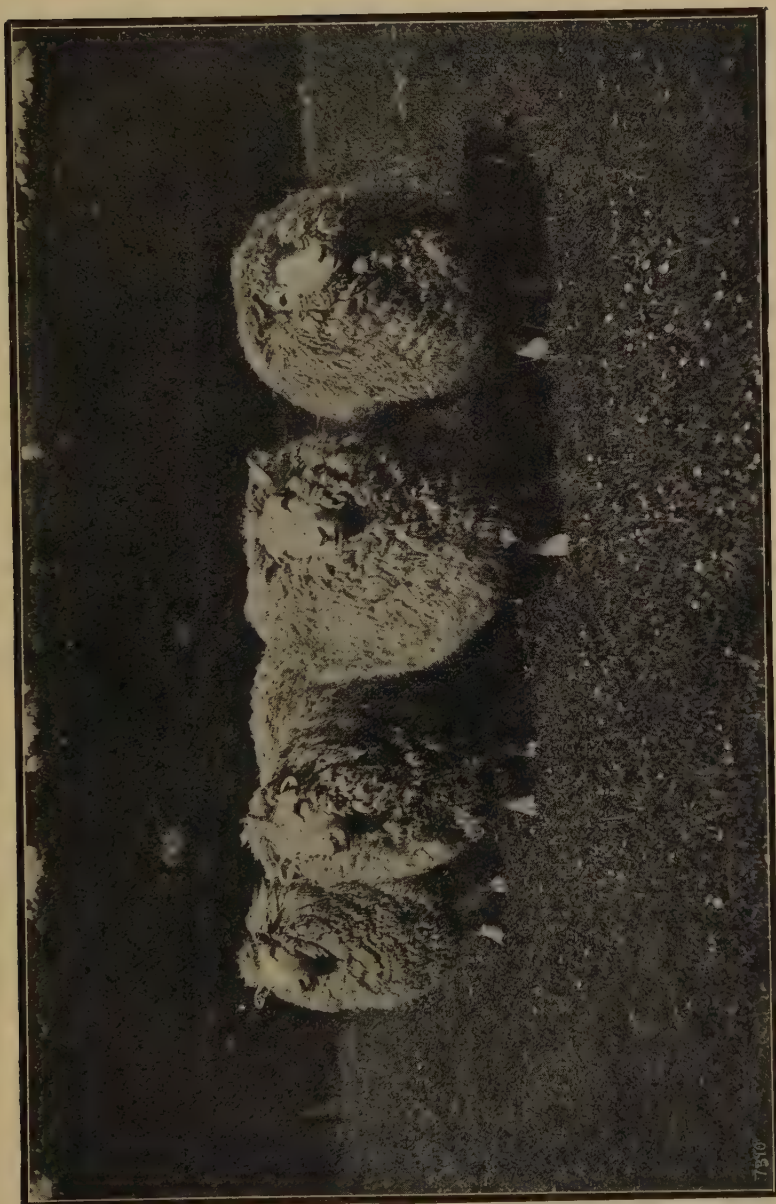
LAMB-TROUBLES.

Another source of loss to the sheep-farmer, if the necessity for proper preventive measures be not acted upon, lies in the tendency of lambs—usually single lambs—to develop a condition of acute congestion of the kidneys, due to overnutrition when their dams are on good feed and are yielding a plenitude of rich milk. Earlier in this article I indicated the necessity for providing plenty of good feed for ewes suckling their lambs as preferable to putting them on it before their lambs are born. This is especially necessary for the production of early lambs of good freezing-quality, but the lambs need careful watching in order to ensure that they do not suffer as a consequence of too plentiful and too rich a food-supply. Twin lambs, having to share the milk of one ewe, are rarely affected with kidney-congestion, single lambs being the chief sufferers. The remedy is simple, seeing that the trouble in most cases makes its appearance before the lambs are cut and tailed, what is needed being something which will counteract the plethoric condition of the system and the consequent overworking of the kidneys; this is provided by the bleeding which results from these operations. This relieves the plethora and enables the system to regain its normal balance, the lambs consequently continuing to do well after a quick recovery from the temporary check. Whenever fat lusty lambs commence to die the whole of those in the flock should at once be cut and tailed. This will usually stop the trouble, though occasionally it occurs later, a little time after marking. Then the blood-letting resulting from taking a little bit more off the tail does good. Or removing ewes and lambs for a little time to a poorer pasture and ensuring a sufficient amount of exercise is of great value as a measure to counteract the mortality, though it may throw back

in condition the more backward lambs. When carrying out the operations of cutting and tailing, care must be taken to ensure that any knife used is perfectly clean. I well remember a heavy mortality due to blood-poisoning which occurred in a lot of lambs which were operated upon with an unsterilized knife often used by its owner for skinning dead sheep. The practice of searing the stump of the tail of lambs is often adopted, and where the lambs are not in really high condition it is a good practice. The lamb which is not plethoric falls back temporarily through loss of blood and searing helps to prevent this. But with fat, lusty single lambs a little bleeding does no harm at all, but may have the effect of keeping alive good marketable lambs which otherwise would be lost. At one time this mortality which annually occurs in lambs through congestion of the kidneys (though now much less in extent than formerly) was largely ascribed by owners to the reputed evil effect of wool-balls in the stomach, many having examined dead lambs and, finding these accumulations of wool, blamed them for being the cause of death. This was entirely fallacious, and though it is not absolutely impossible that a "wool-ball" might under special circumstances work mischief in the digestive system I have never yet seen a case or heard of one where it was proved to have caused death. As a matter of fact, a considerable proportion of fat healthy lambs are found, when slaughtered, to have these wool-balls present in the stomach (abomasum). Last season arrangements were made to collect some records on this point, and at six different freezing-works the stomachs of a number of good, healthy lambs were examined, after slaughter, in order to determine whether wool-balls were present or not. In all 4,043 were examined, and of these 20 per cent. were found to contain wool-balls of varying sizes. The sheep-farmer has no need to trouble himself about wool-balls. What he should realize, however, is that in sheep-breeding and sheep-management the greatest measure of success is gained by the man who uses his brains and knowledge to the best advantage in fostering the natural processes of body-development and fattening to the greatest extent compatible with the maintenance of health. To attempt to go beyond that means not only a risk, but a probability of loss.

(To be continued.)

NO breeder has ever permanently advanced any character in an animal who has neglected to maintain constitution in the process.



ROMNEY EWES IN THE STUD FLOCK OF MR. W. GIBSON, KIWITEA.

HOME SEPARATION.

G. M. VALENTINE.

METHODS OF CONVEYANCE.

IN those districts where the home separator has been adopted there has naturally followed a radical change in the system of handling the cream. Taken up in the first instance by settlers remote from a creamery or factory, or who had bad roads to contend against, it gradually spread until in the North Auckland district it is practically the only system in vogue, and the cream-can is as common as the mail-bag. The carriage of the cream is one of the most difficult problems with which the home-separator factory has to deal. Cans arrive by packhorse, wagon, rail, oil-launch, and, in fact, by any and every means of transport available. The first system to be adopted was for every supplier to bring his own cream, and this is still the practice at a good number of factories. From the buttermaker's point of view this is the ideal system, as the weighing is done in the presence of the supplier, and an opportunity is thereby given for pointing out any defects in the cream. In some cases a system developed of one settler bringing the cream from several neighbours on the same road, which in time developed into a regular contract arranged by the factory for the collection and delivery of the cream. Indeed, in some instances the cream is two days on the road and is carried by two different contractors. This is not only expensive—costing as high as 1d. per pound of butter-fat for cartage—but is altogether against the cream reaching its destination in a good condition. Contractors for the carriage of cream are paid in various ways: 'at per hundredweight of cream carried, at per trip, or at per gallon of cream. In some cases the whole cost of collecting is borne by the factory, while in others the cost is allocated amongst the suppliers according to the number of pounds of butter-fat delivered by each. Figures taken from two factory balance-sheets for last year give the cost as 0.5d. and 0.895d. per pound on the whole of the butter-fat delivered to the factory, so that in comparing the net amount actually paid for butter-fat this must be taken into consideration. The first system has the advantage that the factory-manager has more direct control over the delivery of the cream, the decision resting with him as to how often the collecting shall be done. When freights are charged up individually the inclination is for

suppliers to want to send less frequently, on account of the cost, as soon as supplies begin to fall off. This explains the fact that, while some home-separation factories can hold their own as to quality while the flush of the season is on, they find it impossible to do so in the spring and autumn. This is the weak spot in the home-separator system. Under ordinary conditions the best quality of butter is made under a daily delivery.

A practice generally in use is for the individual supplier to provide his own cans, and under existing conditions the life of these is somewhat short. Wagons may be seen loaded with two tiers of cans, the larger ones with flat covers underneath and the smaller ones on top. The wear-and-tear is very considerable, and cans will sometimes only last two seasons. The usual method is to weigh and sample the cream, wash the cans, and pass them on to the vehicle by which they arrived. The washing is necessarily a more or less speedy performance, and the lids are usually put on while the can is still hot. It is therefore absolutely necessary to again wash them on their return to the farm. The principal disadvantage of this system is that the factory-manager does not come into direct touch with the suppliers, and has not the opportunity of pointing out any defects in the cream.

Another system of collecting, usually adopted where there is a large number of small suppliers, is to weigh and sample the cream at the farm and empty it into large cans. This saves a lot of cartage, but as success depends entirely on the drivers, it is imperative that they should be trained men employed by the factory. The great danger is that one bad lot of cream may be overlooked and spoil a whole canful. Given good men, this plan is very successful, for their personal contact with the suppliers can be of great assistance to the factory-manager. One difficulty associated with it is getting a scale which will be sufficiently accurate and which will stand the rough usage and weather inseparable from the road. It will usually be found that on the average the total weights from the drivers' books will be more than the weight of cream received at the factory, due to the difficulty of weighing a number of small lots of cream correctly, and also to the loss of cream left in the cans. The latter can be reduced to a very small amount, however, by using a squeegee scraper for cleaning out the cans. This can be made of hard red $\frac{3}{8}$ in. rubber, 5 in. square. A metal stirrer must also be carried by the drivers with which to mix the cream before taking the sample, or the results in testing will be all against the factory. The sample-bottles must be kept tightly corked to prevent evaporation, and a wet sack thrown over them in hot weather will help to keep them in good order. Wet canvas coverings over the cream-cans will also be found to reduce the temperature of the cream very considerably.

WEIGHING, SAMPLING, AND TESTING

Of home-separator cream, though at first sight a simple matter, requires very careful attention if justice is to be done to both factory and supplier. Were all cream delivered to the factories in sweet, fresh condition this would be a simple matter, but, unfortunately, most of the cream received at home-separator factories is two days old. In some cases it is quite impossible to get a representative sample. The first consideration of managers under the new system was, naturally, how to keep up the quality of their butter under the very heavy handicaps which it imposed, and rightly so. As a consequence, certain points have in a measure been neglected, and in the majority of cases the suppliers have been paid for more butter-fat than they delivered, due to a too-liberal reading of the "fat" column. Neglect of these points has given rise to the very general impression among farmers that the supplier who delivers his cream makes the most out of his cows. If this be so, the supplier of rich cream must be losing more in his skim-milk; but the very general experience of home-separator factory-managers, who have done a lot of skim-milk testing for suppliers, is that this is not so. Indeed, the chances are all in favour of better skimming, as the speed is more likely to be maintained when aiming at a rich cream. Similarly, where the cream is thin it is usually the result of driving the separator too slow. Michels says, "Most standard makes of separators will do good work when delivering cream containing 50 per cent. of butter-fat." ("Creamery Buttermaking," Michels, page 61.) If the sampling and testing are not properly done, however, the thin cream will no doubt pay the supplier best, especially if it is sour when delivered. Unless it is thoroughly stirred, the sour milk at the bottom will not be properly mixed with the cream and the sample taken will be too rich. Again, if a pipette is used to measure the sample into the cream-testing bottle the result from thin cream will be about right, but the rich cream may be 2 per cent. too low. Allowing, however, that the samples are weighed into the cream-bottles, by reading the "fat" column to extreme points, as is very often done, it is possible to be 2 per cent. too high with both samples; but 2 per cent. added to a 35 test and 2 per cent. added to a 42 test is not fair to the latter. The most satisfactory cream for both supplier and factory is one containing from 40 to 45 per cent. of butter-fat, and any good separator will do very satisfactory work between these points if reasonable care is taken in running it. A thin cream is a loss to every one concerned, and those factories that pay $\frac{1}{2}$ d. per pound of butter-fat less for cream testing 35 per cent. and under are on the right track.

The first question of freight alone is a big one. A five-horse wagon will bring in a load of about 4,000 lb. of cream, which at an average

test of 42 will produce 1,680 lb. butter-fat. To produce the same amount of butter-fat at a 35 test it would have to carry 4,800 lb. of cream, a difference of 20 per cent.; and this 20 per cent. extra will have to be handled right through the manufacturing process until the churning process is reached. The suppliers, on the other hand, will have 800 lb. less skim-milk on the farm. Most of the bad flavours noticed on the receiving-platform are found in thin cream, which develops acid quicker than a rich cream, has a rough, lumpy appearance, blocks up the strainer, burns on the pasteurizer, is almost impossible to sample fairly, causes a bigger loss in buttermilk, and, when manufactured into butter, usually makes an inferior article. A 42-per-cent. cream, on the other hand, is smooth and free from lumps, can be more accurately sampled, and leaves more skim-milk on the farm. It will keep sweet longer, and when sour more frequently develops a clean acid flavour. It costs less per pound of butter to manufacture, gives a bigger overrun, and, with proper handling, will turn out a higher-grade article.

QUALITY OF CREAM DETERMINES QUALITY OF BUTTER.

That on the amount of care exercised on the receiving-platform largely depends the quality of the butter turned out is as true under home separation as it always has been where whole milk is received; the manager who sets a high standard and insists on the cream being up to that standard is still making the best butter. Where, owing to competition and other causes, managers have to take in cream which should not be accepted, the quality of the butter is correspondingly low. Some suppliers argue that so long as a factory output is all first grade all is well, but the reputation of New Zealand butter was not built up on an 88 grade, and it is not likely to be maintained by the manufacture of an article of such quality. To accept everything that comes along, as some managers are unfortunately instructed to do, is altogether wrong in principle, and simply means that the supplier of good cream has to help to pay for the carelessness of a careless neighbour.

Cream-grading has been successfully tried at a number of factories, and payments made according to the condition of the cream. There is an almost universal agitation in countries working under the home-separator system for its adoption. The standard fixed in those New Zealand factories which have adopted grading is not very exacting, and may be reached by any supplier with reasonable care. First grade is usually cream testing over 35 per cent. of butter-fat, smooth texture and clean in flavour, though not necessarily sweet; second grade, cream testing under 35 per cent. of butter-fat, or coarse in texture or unclean in flavour, and is paid for at $\frac{1}{2}$ d. per pound less.

Each can received has the owner's name and address painted on the lid or stamped on a brass label (as well as that of the factory to which it is consigned when full, if sent by rail), in addition to the tare weight, on the can. In most factories the practice is to weigh the cream in the can and deduct the weight of the latter. A weigh-can is sometimes used. It is satisfactory with thin or fresh cream, but is quite unsuitable with thick sour cream. Some managers take the weight of the empty cans to the nearest pound, while others mark them to a quarter of a pound. Similarly the cream may be credited to half a pound to the nearest pound, or all fractions may be taken by the factory. The second is the most common practice, and it certainly has the advantage of saving a lot of figures. Weight-slips are returned to the suppliers daily or weekly, and on testing-days have the test added. Of the various kinds of scales in use, those having the dial face have the advantage of being very quick, but it is a wise precaution to have some stamped weights at hand and try them daily, whatever the make. A scale only half a pound out can make a big difference in the day's results where a large number of cans is being weighed, especially in the autumn, when weights are small.

Generally speaking, the weighing is very conscientiously done at all the factories I have had the privilege of visiting, and if some suppliers could see their cream for themselves on arrival at the factory they would understand why the weight is short. Because a can weighs 50 lb. when filled to a certain mark to-day, it does not follow that it will weigh the same if filled to the same mark the next time it is sent. I have seen an 8-gallon cream-can, filled to within 2 in. of the top, which weighed 47 lb. net, running over on the way to the factory, due to its fermenting. Such cream should be returned to the supplier.

There is room for improvement in the rinsing of floats and cans at a great many factories. Some managers will use a half-ounce dipper for sampling to save waste of cream, and leave an ounce sticking to the floats, on the plea of want of time. The rubber squeegee before referred to will remove all the cream from the floats, and do it as quickly as the open hand or scraping them on the top of the can. A quick and effectual way of rinsing the cans is by means of a steamer fixed over the receiving-vat, the cans being inverted over it. This can be easily arranged by fixing two lengths of pipe across the vat, with a goose-necked steam jet between them. The steam will immediately loosen the cream, which drops into the vat, and while one can is steaming another is being weighed, so that there is absolutely no waste. Objection may be made that the heating will have a bad effect on the cream in the vat, but the same may be said of a can of hot rinsing-water. This objection does not hold good in practice, as

immediately the heated cream drops into the vat it sinks to the bottom and finds its way to the tap at the lowest point. If the cans have much sticking to them and a steamer cannot be used, a steam hose is a good substitute.

No factory-manager who has once used a strainer and has repeatedly seen what it collects would ever think of doing without one. Many object that it is too slow and the cream will not run through. If made with the wire gauze commonly used for milk-strainers this is true. Made of tinned steel, punched with holes $\frac{3}{32}$ in. in diameter in the bottom and sides and big enough to hold several gallons, this drawback is removed. By catching the casein it will give an indication of how the farm separator has been run, and it will ensure more even feed to the pasteurizer by breaking up the cream, which would otherwise block the taps.

TRIUMPH OAT AS FODDER.

T. W. LONSDALE.

It is well known that only with liberal feeding is the dairy cow stimulated to the best milk-yield within her capacity. So generous is she in the return for time and money spent on her that many dairy-farmers acknowledge they seldom supply their cows with sufficient feed to induce the largest flow of milk possible by all members of the herd. On the other hand, when fed sparingly or with fodder of faulty character the normal milk-flow is diminished. It is obviously essential that not only from the humane view-point, but as a business proposition, the dairy cow should be provided with an abundant supply of the best milk-producing food.

Many varieties of fodder are grown for the purpose, and in old-established dairying countries a mixture of oats and peas has for many years been grown. As there are numerous varieties of oats—some more suitable than others for providing a large amount of fodder—it is advisable to grow the oat best adapted to the purpose. It is questionable if a better variety than Triumph is known for producing a green fodder, and grown in conjunction with peas it will provide ideal food for dairy stock. This oat is a strong-growing variety, producing a great quantity of flag and strong upright straw. It is therefore adapted for giving the necessary support to the peas, whereas an oat producing fine straw would be useless.

MOTOR TRACTION ON THE FARM.

THE "AGRIMOTOR."

E. CLIFTON.

THE farm is already supplied with a reliable power-producer in the fixed or portable internal-combustion or oil engine now installed on numerous farms. It is of all dimensions, from the small requirements of the cream-separator or the shearing-machine to those of the chaff-cutter and threshing-machine. The internal-combustion engine stands high in the appreciation of the farmer. It is in readiness for work at a few moments' preparation, and the modern types are simple and reliable.

Manufacturers now offer an "agrimotor," or farm tractor, of all dimensions, of all ranges of horse-power, and for all purposes, from the implement of 50 horse-power and 15 tons weight for the farmer on the prairie of Canada, or the ranchowner of the plains of Argentina, or the contractor conveying wool over hundreds of miles in Australia, to the pigmy capacity required in the garden.

There are many purposes to which the motor tractor can be applied on the farm. These are almost too numerous to mention; among them are, however, the chaffcutter, the threshing-machine, the corn-crusher, the pump, the saw-bench, the shearing-machine, and, not to be forgotten, the plough, as well as the general implements of tillage and harvest. With this, the first words almost certain to be uttered are, "The farm tractor cannot take the place of the horse." "Where is the sowing?" "Horses have still to be kept." It is probable, even certain, that this tractor will not do away with any horse. Indeed, it is trusted that it will not. It is, however, believed that the application of mechanical power will materially increase the production of the farm and improve its condition. There are certain times on the farm when the horse-power that is generally kept is unable to keep up with the work, as at and immediately after harvest, when stubble should be ploughed and the horses are all employed carting; also when the land is to be ploughed and cultivated for cropping in a catchy season. It is at all these times that the reserve power of the tractor becomes of all importance; and, remember, it is not demanding feeding and attention when not working. It is not to be assumed or believed that this implement is to be used only on relief-works. This

may be an immediate purpose. There is, however, the assurance that the manufacturers of the world are keenly watching the requirements of the farm, and are alert to the adaptation of the machine to meet those needs, and this with the utmost economy and reliable efficiency.

The farmer who is fortunate to own or who can obtain the services of a power outfit to plough or cultivate when occasion demands has an advantage over those who are not so provided. He can work the soil to whatever depth its nature permits. He can quickly overtake work. It is probable this last consideration is of the greater importance. This particularly applies where rain in certain places suspends operations for weeks. This naturally causes a pressure of work to be overcome in a curtailed season. It is an incalculable advantage to have the implements and the power at hand to utilize to the uttermost every opportunity afforded by the weather. This is so far as assisting or relieving. There is the factor of deep cultivation—deep stirring, not deep ploughing—to consider. This is usually accepted as desirable, but set aside as costly and practically impossible to accomplish with horse-power. It is actually both costly and difficult. It came to the writer to subsoil for orchard planting 250 acres to about 16 in. in depth. There were good teams and careful men, but half an acre per day with four horses about represented the average of the day's work. The work of cultivating a few acres to this depth is not a serious undertaking. It is when the acres are many that the labour is appreciated, and this is the task of power from steam or petrol. A particular instance of the value of deep tillage has been afforded recently in Great Britain. Some 3,000 acres of sugar-beet have been grown in the eastern counties. These are spread over a wide area. The crops vary in size from a few acres up to 100 acres. The cultivation is as varied as the acreages of the fields. Some are horse ploughed and cultivated, others deeply stirred with steam-power implements. It is claimed that the crops on the former were disappointing, while on the latter, power-tilled, they were both superior and heavier in yield. Such differences are mentioned as 5 tons and 17 tons, as the preparation of the soil was shallow or deep. The sugar-beet is no doubt a plant that requires a deep, well-prepared soil, and there are other crops that appreciate and respond to deep tillage. This can be provided by the agrimotor. In this it is not to be understood that deep tillage is recommended on all soils and in all conditions. It is, indeed, not so. Deep tillage can be profitable only on fertile and well-drained soils. These respond while similar cultivation on poor wet soil is simply the dissipation of both energy and money.

The present oil-tractors for the farm may be separated into two groups. Those of large dimensions and of high power are suitable for

contractors and large properties, while those of the other group are specially adapted to the average farm and even to the orchard and garden.

Of the large type, there is built in England, engined by Messrs. Hornsby and constructed by W. Foster and Co., for export to South America, an internal-combustion petrol engine or agrimotor of 55 b.h.p., in weight 14 tons. It is two-cylindere, and the mechanism is of the simplest design. The wearing-parts are massive. The driving-wheels are 8 ft. in diameter. There is embodied in it a remarkable



THE 3 H.P. AGRIMOTOR AS A PLOUGH.

device for starting. This implement has successfully undergone trial. It is declared extremely suitable for the special conditions for which it is intended—that of cultivation on extensive level country.

In New Zealand there are now in operation several agricultural tractors, manufactured by the International Harvester Company, U.S.A. The 20 b.h.p. is a single cylinder engine. It is started with petrol and worked with kerosene. In weight it is about 5 tons 10 cwt. It is carried on wheels of which the tire is 20 in. wide. The Department of Agriculture is operating one of the implements. With it a plough of five furrows was successfully used on land that was particularly hard. The plough is arranged on a frame bringing one mould-board

close to the tractor, so enabling turning to be accomplished on a headland of reasonable width. In Canterbury, Southland, Auckland, and other districts the owners of these tractors are particularly well pleased with them. The importers are in receipt of many gratifying testimonials. The purchasers are farmers and contractors who thresh and chaff by agreement and who undertake ploughing for farmers.

The somewhat smaller type, yet not the smallest, is one lately imported into Canterbury. The manufacturers of this machine, "The Universal," are Messrs. Saunderson and Giffkins, Bedford, England. It is of four cylinders, is water-cooled, is started on petrol, and is worked with kerosene. The wheels are in height 5 ft., the tires being 18 in. wide, and the weight $4\frac{1}{2}$ tons. It operated with ease a four-furrow



THE AGRIMOTOR AS A CULTIVATOR.

plough to the entire approval of the farmers who were present at the recent demonstration at Lincoln.

The agrimotor that more directly appeals to the smaller farmer, to the orchardist, and even to the gardener is one lately placed on the market by Messrs. Wyles, of Evesham, England. It is available for the field, the orchard, and the garden. It is claimed that this implement is of the type that, when one sees it, the natural exclamation is, "Why has not this been thought of before?" The inventor is an engineer who is interested in farm pursuits. This agrimotor is the outcome of the combination of the trained skill of the engineer and the practical knowledge of the wants of the small farm. It is described as

a self-contained motor-plough the cost being £75. The petrol engine is of 4 b.h.p., it is water-cooled, magneto ignition. The weight of the whole single-furrow implement is 6 cwt. It is driven through a metal cone clutch, with chain and spur-wheels to the driving-wheels proper. The engine is so governed that the attendant has to operate only the clutch, the adjustment of the driving-wheel regulating the depth. The designer has ingeniously provided for the necessary adjustment of the two driving-wheels independently of each other. The frame is constructed to admit of the direct attachment of implements for harrowing, drilling, hoeing, &c.

At a public demonstration in England the 4-horse-power motor-plough cut a furrow of 6 in. It travelled at a speed of over three miles per hour. The first furrow was opened with the wheels level. The steering was simple. The plough was quickly turned on the narrowest of headlands. The furrow-wheel was readily adjusted, and the implement started on its return. When the land was opened out the implement was permitted to proceed unattended. The adjustment and balance were so complete that a straight and even course was maintained to the end of the furrow. Inequalities of the surface and differences in the texture of the soil were easily overcome. It was estimated that in ordinary ploughing and with reasonable conditions of soil this implement consumed 2 gallons of petrol per acre. This particular demonstration was performed under unfavourable weather-conditions, the soil being in a sodden state. It was, however, completed to the eminent satisfaction of the interested observers.

The same makers exhibited a still smaller implement for use in root crops, or orchards, or gardens. This is hand-guided, the driving-wheels being adjustable laterally. It operates as a cultivator or hoe through trees or rows of plants where horses are inadmissible and where manual work would be both tedious and costly.

The small agrimotors should rapidly secure favourable attention. The cost is within the capacity of even small orchardists or market-gardeners. With these, used in the orchard and the market garden, the horse can be entirely displaced. The weight is light. They are easily operated. They can even work on land that the horse could not traverse, and they are reliable. This implement can be equipped with a belt-pulley. With this other machinery can be used, and the farmer can thus be provided with an agrimotor and a stationary power-outfit.

The agricultural land of New Zealand has reached a high price. Increased production is necessary to maintain our prosperity. Our farmers must avail themselves of the most modern appliances of cultivation, and of these the most valuable may be the agrimotor.

FRUIT - DISTRIBUTION.

WILLIAM C. HYDE.

A POSSIBLE REVOLUTION IN LOCAL MARKETING.

CONSIDERABLE attention has been given to the *production* of high-grade fruit—the selection of the land, methods of culture, combating of disease and pests, storing the crop, and the grading and packing of the fruit. All these details have formed the subjects of articles, discussions, and demonstrations, in order that the produce may be grown to perfection and packed in a clean and an attractive manner. The fruit having been successfully produced and properly prepared for market, the commercial fruitgrower naturally looks for a return to cover interest, labour, and cost of material. Thus we arrive at the second important phase of fruit-culture—distribution, a subject that is made increasingly difficult owing to the perishable nature of the produce. Adequate return for patience, energy, and skill expended on production depends almost entirely on a wise and carefully organized distribution. Attention to this subject is the more pressing in view of the rapidly extending nature of the industry, which is attracting many people and much capital at the present time.

That an ample demand for fruit exists is undoubted, but that a carefully organized system of distribution is necessary in order to supply that demand effectively is not generally recognized. Precedent often has been kind and generous, and a false sense of security has in many cases been thus established, the slowly changing circumstances being often overlooked and sometimes altogether ignored.

The subject of distribution may be classified under two headings—(1) export, (2) domestic; and the latter again under (a) by means of agents, (b) direct to the consumer. There is no doubt *all* these means are necessary, and to be effective each must be organized to a fine degree—*i.e.*, by the removal of every obstruction that hinders the steady flow of the product in the direction of the demand.

Referring to that important part of the general scheme of distribution coming under the heading of “Direct Fruit-supply to Consumers within the Dominion,” valuable parcel-post facilities have been afforded by the organization recently completed by the Postal Department, which came into force on the 1st January of this year. By means of

this the carrying services—postal, railage, shipping, and cartage—have been induced to co-operate and work under fixed standard rates, with the prospect of an extension of the scheme in the future as soon as circumstances warrant it.

A fresh-fruit supply is becoming a growing need in the households of the people of to-day. Experience has long since proved that there is a very large number of consumers desirous of getting periodical supplies direct from the grower, and so securing the advantages immediately apparent when the perishable nature of the goods concerned is taken into consideration. Whilst this trade has been cultivated by many growers and has assumed considerable dimensions, it has been seriously interfered with (1) by the heavy freight charges and delayed delivery that were unavoidable when small consignments had to be dealt with and such consignments had to be transhipped: (2) by the correspondence and book-keeping, which entailed a heavy drain on the resources of the grower, at a time, too, when these resources are tested to the utmost—the harvest-time. The first disability discouraged the consumers and reduced this form of distribution to a minimum: the second discouraged the growers and thus further hampered this desirable direct trade. These drawbacks have now been entirely removed by the organization above referred to. By consigning fruit on the railway by “Parcels” it is given the utmost despatch, and, with rare exception, a case of fruit can be consigned from any railway-station in the Dominion and delivered *to the house* of the consumer in the largest centres of the same Island for 9d. or 1s., according to the size of the case. If it has to go “oversea,” and transhipment is necessary, it can be “booked through” in one consignment-note at standard rates that are but a fraction of those that ruled previously, and, what is as valuable, time in transit has been reduced in equal degree. Correspondence and book-keeping on the part of the grower have been almost obliterated by the “fruit-order coupon” system of the Post Office, or, in other words, the “cash-with-order” method of sending fruit through the Post Office from producer to consumer direct. The freights being assessed by a competent clerk, and the whole order having his supervision, errors in ordering are being reduced to a minimum. Ripe stone-fruits (apricots, peaches, and cherries) have been sent under the above system from the centre of the North Island to Otago, and *vice versa*, and have been delivered within forty-eight hours in excellent condition. Consumers and growers alike have expressed and shown practical appreciation of these facilities, though not, in the case of the grower particularly, to the immediate extent expected. The new regulations, however, were only published in the middle of the stone-fruit season—the busiest period in the growers’ calendar, a period that does not permit time to reorganize, and, indeed, when contracts and arrangements have often

already been made for the distribution of the crop. It is most desirable that growers should, in their own interest, thoroughly test this scheme at the earliest opportunity in order that the facilities provided may be continued, and, if necessary, gradually moulded to fit the circumstances. It should be recognized that the first move in this direction is to advertise, either by circular or in the newspapers. Inquiries made by consumers have indicated the demand along these channels, but they have been unable to take advantage of the system because they did not know the classes of fruit available, definite sources of supply, and the prices demanded. Investigation has also revealed the fact that fruit-growers' associations generally are not yet sufficiently united to operate under the scheme, and that the work must be done by individuals, but doubtless this condition will not last much longer.

May the time soon come when the advantages of co-operative marketing will be recognized as they should be, and when the innumerable brands, grades, and cases are simplified and standardized, so that the goods may be given that cheaper and quicker despatch so necessary in successful fruit-distribution, and consequently profitable production.

DEPARTMENTAL DISPLAYS AT SHOWS.

OWING to the very heavy demand made by departmental exhibits on the time of the expert officers of the Department, and the cost involved in the preparation, it has been decided to restrict the number of shows to be attended. In future two main displays will be made each year—one in the North Island and the other in the South Island. The former will be made alternately at Palmerston North and Auckland; provided that should the Auckland Agricultural and Pastoral Association not be holding a winter show in the year in which its turn falls the display will be made at Hamilton. In the South Island the main display will be made at the Dunedin Winter Show. In addition to these main displays, two other exhibits (one in each Island) on a smaller scale will be made each year at the following places, taken in rotation, if the necessary arrangements can be made: North Island—Hamilton, New Plymouth, Hawera, Hastings, and a northern town such as Whangarei or Dargaville; South Island—Invercargill, Nelson, Blenheim, Christchurch, Timaru, and Ashburton.

During the coming winter-show season exhibits will be made at Palmerston North and Hamilton in the North Island, and Dunedin and Invercargill in the South Island.

FRUIT-EXPORT.

J. H. THORP.

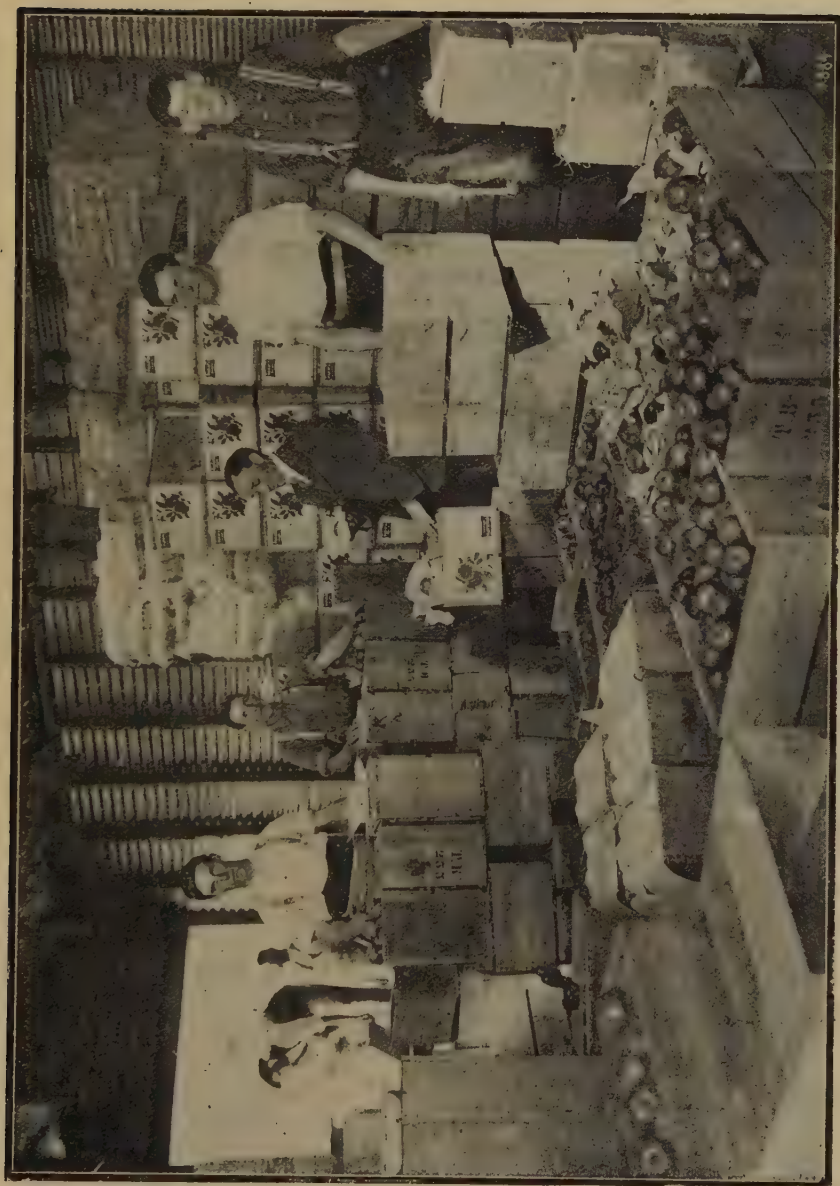
THE first shipment of fruit for export to South America this season was despatched by the s.s. "Alexander" from Motueka, on the 4th March, to Wellington, where it was transhipped to the s.s. "Remuera" for its destination.



A TIER OF MOTUEKA APPLE-CASES READY FOR SHIPMENT.

The quantity forwarded was 3,370 dump cases, made up as follows: Monroe's Favourite 1,156, Jonathan 1,045, Cox's Orange Pippin 266, New York Pippin (Cleopatra) 250, Hoover 234, Reinette du Canada 109, Spitzenburg 87, Adams' Pearmain 38, Worcester Pearmain 63, Blenheim Orange 47, Ribstone Pippin 21, Cellini 16, Allington Pippin 12, Alexander 5, Dessert (unnamed) 6, Winesap 3. Some of the Jonathans, although apparently mature, were of rather poor colour, and the same may be said of some cases of Monroe's Favourite. In picking it would be

well if growers would take a little more care to select only those apples that show most colour, leaving the others to fill out and colour up for later shipments. Hoovers, although of good colour and apparently mature at the time, are really a late apple, and are better left on the



PACKING MOTUEKA APPLES FOR EXPORT.

The Department's Inspector and the local expert packers at work. Bales of wood-wool for packing the apples in the background.

trees till later in the season. The New York Pippins (Cleopatras) were a nice line. Although apparently an early shipment of this variety, it is one that will stand shipping on the green side. All the other varieties were in good condition for shipment.

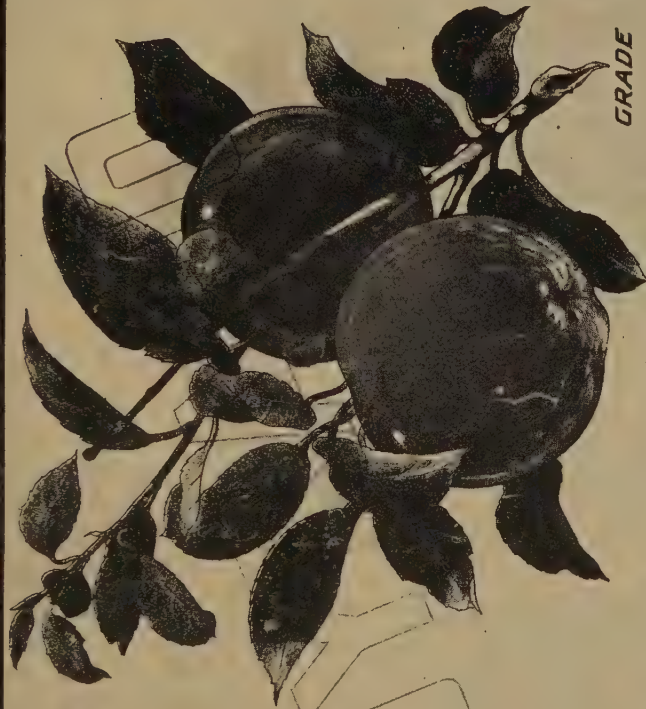
The fruit on the whole was well graded. Part of the shipment was branded "large" and "medium," while the balance was marked in sizes, uniformity in this respect being desirable. The fruit was shipped by Messrs. E. Buxton and Co., of Nelson, and the bulk of it was packed by their expert Tasmanian packers, of whom they now have four in their employ. The balance was packed by the Moutere Asso-



SCENE ON THE MOTUEKA WHARF.

ciation's packers. Excepting a case or two a little on the loose side, the packing was excellent. This season the principle has been initiated of packing all the fruit at a central packing-shed, a store at the wharf being used for this purpose. The fruit is carted in loose and graded and packed there, saving a great loss of time in going from orchard to orchard, and also enabling the work of inspection to be carried out more thoroughly.

The cases supplied by growers for the export trade leave a great deal to be desired, some of them being old and stained, besides being badly made, with the boards overlapping the ends and with only two nails in each end instead of three, thus incurring great risk of ullage. In only one instance was there any attempt made to trim the cases,



GRADE

MONROE'S FAVOURITE



THE LABEL IN USE BY MOTUEKA SHIPPERS FOR EXPORT APPLE-CASES.

TIDMARELL NICKSON & GONDER 11740

and where this was done the better appearance of the cases was very marked and was commented upon. A departure has been made this season in the method of marking the cases, the stencilling being replaced by a neatly designed label, for which the shippers are to be highly commended. I would much like to see the words "New Zealand Apples" appearing on the label.

As there are several more shipments to go forward this season, I trust growers will supply their best fruit as well as giving attention to the smaller details. We are now embarking on the export trade against more experienced competitors, and it behoves all interested in the industry to do their best to put that trade in a similar position to that occupied by our dairy-produce and meat trades. It is only by giving attention to the matters I have endeavoured to bring before growers in this article that this can be accomplished.

CERTIFICATES IN SPRAYING AND PRUNING.

T. W. KIRK.

SOME time since arrangements were made by which the Orchards, Gardens, and Apiaries Division of the Department undertook to conduct examinations, both written and practical, of persons desirous of obtaining certificates of competency in the work of spraying and pruning. Up to the present time the following have passed the examinations and hold departmental certificates:—

Spraying and Pruning.

Mackenzie, Thomas, Cromwell.
Harrow, C. C., Christchurch.
Thorne, Frederick A., Christchurch.
Kalaugher, J. P., Devonport, Auckland.
Brine, J., Wanganui East.
Brown, N. B., Wanganui East.
Hayward, F. H., Kaikoura.

Spraying only.

Boniface, H. A. J., Gisborne.

As the season for winter spraying is rapidly approaching, persons desirous of obtaining these certificates should notify the Director of Orchards, Gardens, and Apiaries, Mr. T. W. Kirk, without delay. He will then arrange for examinations to be held at suitable centres.

VACCINE THERAPY.

H. A. REID, F.R.C.V.S., D.V.H.

READERS of the *Journal* may remember a case reported in the issue of August, 1912, of a draught mare suffering from multiple sinuses of the quarter and hip, then under treatment by means of bacterial vaccines. In spite of the encouraging results obtained up to the time of recording particulars of the case, doubt was expressed as to whether the mare might ultimately become workably sound. It was decided, however, to persevere with the treatment. It may therefore be of some interest to relate that without in any way modifying the method of application the mare has completely recovered, and has for some time been doing very useful work. Considering the apparently hopeless nature of the case at the outset, and the fact that for two years it had resisted the application of various other forms of treatment, this result seems worthy of record as a striking example of the efficacy in certain cases of vaccine therapy.

PUREBRED MILKING SHORTHORNS.

A BRITISH RETURN.

IN the last issue of the *Journal of the British Board of Agriculture* there is an article on the famous Kelmscott herd of purebred dairy cows, by the well-known writer on agricultural affairs, "Home Counties." The owners—Messrs. R. W. Hobbs and Son—send milk to London daily from more than two hundred cows, and farm an area of 2,144 acres in contiguous holdings in Oxfordshire, Gloucestershire, and Wiltshire. The herd is said to be the largest collection of purebred dairy Shorthorns in Britain. It has been bred for milk since 1878, and cows and heifer calves are rarely purchased. Careful milk-records have been kept for many years, and every cow's milk is weighed daily. The owners have won the Oxfordshire and the Bath and West Agricultural Societies' prizes for the best herd of dairy cows.

The average milk-yield per cow per year for the three years ending 30th September, 1911, was, for 134 cows, 6,015 lb., this being the lowest average for many years owing to the summer drought. The average yield per cow for 1910 was 6,330 lb. (10½ lb. to the gallon), and for 1909 6,500 lb. The average yield of an average farm cow in Great Britain is perhaps 4,500 lb. During the past three years there

have been on an average fifteen cows milking at Kelmiscott yielding about 1,000 gallons or over. Rose 26th yielded 13,903 lb. from 10th June, 1904, to 10th June, 1905. At Tring Show she gave 72½ lb. 6 oz. in twenty-four hours. Blossom 5th, between 28th December, 1898, and 2nd September, 1908, produced ten calves. Her average annual yield for ten years was 8,049 lb., and her total yield 86,523 lb.

Messrs. Hobbs have made an estimate of the cost of a herd of forty dairy cows under their system. It is sufficiently interesting from a comparative point of view to justify the publication in full. It is as follows:—

ESTIMATED COST OF HERD OF FORTY DAIRY COWS.

	£	s.	d.
Grazing, 1¼ acres per cow = 50 acres, at £1 10s.	75	0	0
Rates at 2s. 6d. in the pound	9	7	6
After-feed, 1½ acres per cow = 50 acres, at 6s.	15	0	0
1½ tons of hay - 50 tons, at £2	100	0	0
56 lb. mangels per day per cow for 210 days = 5¼ tons of 40	52	16	0
Feeding-stuffs, 6d. per cow per day, 210 days	5	5	0
Feeding-stuffs, 2½d. per cow per day, 90 days	0	18	9
40 × 6 3 9 = 247 10 0			

Attendance.

Thirty Weeks' Winter.

	£	s.	d.
Two men to milk and feed, &c., at 16s. per week	1	12	0
Two men to milk (only), at 7s. per week	0	14	0
One lad to wash and clean cows (part time)	0	5	4
One lad to carry in and cool milk (part time)	0	5	4
One lad to weigh milk (part time)	0	5	4
One woman to clean buckets and utensils	0	4	0
30 × 3 6 0 = 99 0 0			

Fourteen Weeks' Summer.

	£	s.	d.
Four men to milk, at 7s.	1	8	0
One lad to weigh	0	5	0
One lad to carry in and cool	0	5	0
One woman to clean buckets and utensils	0	4	0
14 × 2 2 0 = 29 8 0			
Milk-cart, horse, and driver	40	0	0
Depreciation in value of cows (bought a heifer at £20 and sold in five years at £15) = £1 per year per cow	40	0	0
Losses in death, abortion, and veterinary expenses £1 per cow	40	0	0
Expense of bull, 5s. per cow	10	0	0
Upkeep of dairy utensils, at 5s.	10	0	0
40) 767 15 6			

Per cow £19 3 10

	£	s.	d.
Produce per cow: 600 gallons milk, at 8d.	20	0	0
Value of calf	2	10	0

22 10 0
19 3 10

Balance	£3	6	2	gross profit per cow.
To railway company: Carriage of milk, 600 gallons, at 1d. per gallon	2	10	0	

£0 16 2 net profit per cow.

THE JERSEY COW.

PRIMROSE McCONNELL.

THE Jersey cow has no occasion to enlist the services of an apologist. She is the aristocrat of the cow tribe. She is of "the blood royal," and for generations the greatest care has been taken to guard her against the evil of "morganatic" connection.

In her island home two attempts were made in the early days to improve the breed by crossing with Ayrshire and Shorthorn sires. The results of these crosses were, however, considered so undesirable that the importations and all their descendants were slaughtered—the Jerseymen had no room for crosses. Since that time her purity has been protected by several Acts of Parliament; in fact, the law in this direction is now so strict that cattle-importations to the island are not allowed except for immediate slaughter.

In her native home the Jersey cow is treated more as a member of the human family than as an ordinary chattel, and she is undoubtedly a lovable and attractive animal. No true dairyman can do other than admire her, even if he is convinced in his own mind that she is not the best cow for his purpose.

Weight for weight, and taking the average of whole herds, she will produce more butter-fat than any other known breed. She is also more hardy than she gets credit for; as a matter of fact, I have seen young acclimatized Jerseys wintered out among the snow on the south-west coast of Scotland. I have also taken particular care to note the results of severe weather on the two breeds at this station (Ruakura), and I find that the Jersey is as little affected by the bad weather as the Shorthorn—and the winters here are trying enough. She is naturally of good constitution, and tuberculosis is unknown on the Island of Jersey. In my own opinion, any tendency to delicacy of constitution of individual Jerseys has arisen through too much attention being paid to purely show points, and I think we would do well to encourage a little more of the big-framed roomy cow of undoubted constitution. As showing the great care that is taken by the Jerseymen to keep their herd-book beyond suspicion, I cannot do better than quote from an article by Ernest Matthews, M.A., author of "Economics in Dairy-farming": "Before any animal can be admitted into the herd-book and given a number in either section it must be passed by the herd-book judges. These examinations take



RUBY'S BUTTERCUP.

A New Zealand Jersey, a member of the herd of the Ruakura Farm of Instruction.

place at different times of the year and in various parts of the island. Five or six judges are usually present, but only three are in the ring at one time. *If a judge knows any of the animals, he steps out of the ring, when his place is taken by another.* Two qualifications are given—'Commended' and 'Highly commended'—and animals failing to get either of these commendations are rejected. No female is examined until she has had a calf, *and all bulls must be shown with their dams.* Calves are registered when they are born, and the certificate of registration decides which section of the herd-book they are eligible for when they come up for examination." Mr. Matthews also states, "I have been present at the herd-book examinations in Jersey, and thereby testify to the fact that no animal with a bad udder, teats, &c., could get a number allotted to her, however good she may be in other directions."

It may be truly said of the Jersey that, although naturally timid, under gentle treatment she becomes exceedingly docile. Like most breeds of farm stock, the Jersey may be seen to greatest perfection in her native country, and this is no doubt due to geological as well as geographical conditions.

The unceasing care that has been taken in the development of the dairy qualities of the Jersey has undoubtedly brought her well to the front as a dairy cow, but if the breeders of this valuable animal wish her to retain her present popularity they must get away from the overfine show type, and develop something built on stronger lines. There is not much chance of the "battle of the breeds" being decided yet. One man pins his faith to one breed and his fellow to another breed, and as long as the breeds are kept pure not much harm is done; but the dairyman's trouble begins with the crossing of pure breeds, and although he may be able to rejoice over a few good animals as a result of the first cross, he has nothing certain to work upon, and the end is invariably disappointment. We have plenty of material to work upon among the various dairy breeds we now possess without attempting to form new breeds. As far as can be seen, the dairy industry will always be one of New Zealand's greatest mainstays, but possibly the beef question will have to receive serious consideration in the near future; and as to whether this question will affect the future of the Jersey and other light breeds is a matter of opinion.

The paddock of tares and barley directly in front of the homestead at Ruakura Farm of Instruction has made phenomenal growth, and is now being fed off with dairy stock. The success achieved with this crop on raw poor swamp land speaks volumes for green-manuring.



AN ENGLISH JERSEY CHAMPION, CUTE II.

THE RUAKURA RAPE CROP.

PRIMROSE MCCONNELL.

I HAVE pleasure in reporting another successful rape season, due to a great extent to early sowing, the use of the double ridger, repeated cultivation, and liberal manuring.

In the last-named connection it may be permissible to impress upon readers of this report that on this new poor soil we are compelled to manure with the object of improvement, not merely with the object of maintenance of fertility, as is sufficient on rich virgin soils. If manures were not applied in sufficient quantities, cultivation would, in a manner, be thrown away, as the yield would not be sufficiently large to pay for the cultivation alone. This, of course, refers more to that part of the farm which is in a raw state. Improvement of this land is slow work, but it is trusted that discoveries will be made that will tend to shorten the process.

The first paddock sown was drained during the last winter, and a considerable portion stumped, the latter being a fair sample of some thousands of acres of adjoining uncultivated swamp. It was ploughed with the swamp-plough in June to a depth of 7 in., Cambridge-rolled in July, double-disced, tine-harrowed, double-disced, and tine-harrowed in August, and the seeds and manures sown with the double ridge in the last week of the same month, the seeding being at the rate of 3 lb. Essex rape and 4 oz. mustard per acre.

Through the ravages of small birds part of the paddock had to be resown, and this was fatal to any exact account of manurial experiments; but in this paddock the best result was undoubtedly obtained from basic slag alone. The rows were horse-hoed at intervals during the growth of the rape.

Taking all circumstances into consideration the crop was satisfactory with the exception of portions of the newly stumped land, and with this particular class of soil there is undoubtedly much still to learn as to the proper manner of treating it. At the same time good results cannot reasonably be expected in the initial stages of cultivation of such soils. Experiments are now being undertaken to determine the best manurial treatment.

The crop was fit for feeding by the end of November, the second growth being fed off in January, and the remains ploughed under

in March. The other paddock devoted to rape was of an entirely different class of soil—a strong loam—and had previously grown a very heavy crop of oats. It was twice ploughed during winter to a depth of 7 in., and afterwards rolled, twice double-discd, twice tine-harrowed and rolled, cultivated, and the seeds and manures sown during the first week in November. The double ridger was used as in the former paddock, the rows being 27 in. apart, to admit of horse-hoeing, which was several times done during the growth of the crop.

The rape was fit to feed off seven weeks after the date of sowing, at which time there was an excellent crop all over the field, the mustard on portions of the paddock reaching a height of 7 ft. Even in the driest of weather there was no trace of blight.

At the date of writing (29th March) the crop has been fed off four times, the fifth crop being reserved for ploughing under. This paddock has fattened off an average of fifty sheep and lambs to the acre.

In the manurial experiments the most notable feature is the good results from the "no-manure" plot, the yield from which is a record on this station. In my opinion this was due to the dressing of lime in 1911, the double ploughing, repeated deep cultivation previous to sowing the seed, and surface cultivation during the growth of the crop. It should also be remembered that this paddock is entirely different from the average poor swamp soil in the neighbourhood.

The following table gives the results of the manurial experiments:—

Plot.	Manures per Acre.	Tons per Acre.	Gain by Manure. Tons.
1	No manure	20.7	..
2	Seychelles Island guano, 2½ cwt.; basic slag, 2½ cwt.	35.0	14.3
3	Basic superphosphate, 5 cwt.	35.2	14.5
4	Superphosphate, 5 cwt.	33.6	12.9
5	Basic slag, 5 cwt.	32.5	11.8
6	Seychelles guano, 5 cwt.	27.9	7.2
7	Slag, 2 cwt.; superphosphate, 2 cwt.; steamed bones, 2 cwt.	37.5	16.8

It must be at once admitted that the above results lead to the conclusion that a slightly less quantity of manure would probably have given more profitable results; but such results were unlooked-for and could not have been foreseen by drawing conclusions from former experiments, and, as already pointed out, the soil is much better than the average soil of the farm.

With respect to the addition of mustard to the rape, its value as a corrective cannot be doubted, and in this instance, although some of the lambs were fed entirely on the crop for several weeks, there was no trace of swollen ears or other bad effects that usually arise from feeding on rape alone.

THE BUSH-SICKNESS INVESTIGATION.

C. J. REAKES, D.V.Sc., M.R.C.V.S., and B. C. ASTON, F.I.C.

SOME EXPERIMENTS CONCLUDED.

THE whole of the first series of practical experiments in connection with this investigation, commenced over two years since, have now been concluded. These consisted of the application of various soil-dressings to small paddocks, followed by the grazing of cattle or sheep upon them. Three of these experiments must be looked upon as having been distinctly successful so far as cattle are concerned, and detailed particulars concerning them will no doubt be of interest, though during their progress they have been more than once referred to in the *Journal* as well as in the Annual Report. Following are the particulars:—

Cattle Experiment No. 1.

Land: Partially cleared bush, many stumps and fallen logs being present in the paddocks, surface-sown with grass (principally cocksfoot) and clover. Feed: Plentiful and presenting every appearance of being of good quality.

Paddock, 4 acres, top-dressed with superphosphate, 7 cwt. to acre;* good water available. Three steers, about a year and eight months old, placed in this paddock in April, 1911. Previously, on the 8th January, 1911, three steers of like class, then eighteen months old, had been placed on adjoining land, not top-dressed. These had the same water-supply, and their pasture was apparently equally good, except for the lack of top-dressing, and was much less closely stocked. They, however, had a wide range of pasture, whereas the three on the top-dressed paddock were limited to the 4 acres comprising it. As a matter of fact, the food became so scarce in this paddock in August last that these animals had to be removed to untreated land for four weeks in order to allow the grass to recover itself somewhat. These three steers are at the time of writing (April, 1913) still alive and in good health (see photo.), and, moreover, have grown and developed well throughout. The three control steers have all died of bush sickness, the symptoms exhibited being typical and the clinical opinion confirmed by post-mortem examination.

The first control animal apparently exhibited the initial premonitory symptoms on the 30th April, 1911, and died on the 14th February,

*It is to be noted that the above quantities of fertilizers are large, and are not necessarily those which would be adopted in farming practice.

1912. The second exhibited the first premonitory symptoms on the 20th September, 1911, and died on the 25th April, 1912. The third exhibited the first premonitory symptoms on the 2nd October, 1911, and died on the 27th May, 1912.

It should be further noted that these three control steers had not grown or developed, even before exhibiting any symptoms, in the same normal manner as had the three on the top-dressed paddock. Rock salt was supplied to all alike

Experiments Nos. 2 and 3.

Paddock of cleared and grassed bush land about 5 acres in area, which had been reploughed and sown down with English grasses and clover, manured with Malden Island guano, 10 cwt. per acre. Two



THREE STEERS AFTER TWO YEARS' GRAZING ON PASTURE DRESSED WITH SUPERPHOSPHATE.

Three similar steers grazed for the same period on adjacent undressed land died of bush sickness.

steers, about twenty-one months old, were placed on this paddock in July, 1911. These animals have remained there throughout, showing no signs whatever of bush sickness, and growing and developing in a normal and natural way. One of these had two attacks of some form of indigestion, each of which threw it back temporarily, but on both occasions a good recovery was made without treatment. These animals were transferred to the Manaku Experimental Farm in January last, being still in excellent health. Since going on to the experimental farm they have remained well. Two ewes were also placed in this paddock on the same date as the steers, but one of these unfortunately died as the result of an accident seven months afterwards. The second

lived and remained healthy for sixteen months, when it was worried by a dog. Neither suffered from bush sickness.

Another experiment was carried out in an immediately adjoining paddock of similar land on the same farm. This was a small piece of land, slightly under 2 acres in area, which was ploughed and sown down in English grasses and clover, and manured with blood and bone manure, 7 cwt. to the acre. One steer, about twenty-one months old, was placed on it on the 12th July, 1911, and remained in perfect health and growing well until January last, when it was removed to the Government farm. This animal has kept in good condition through the experiment, and when removed showed every sign of perfect health, and, moreover, since going on to the farm it has still remained healthy. Two ewes were also placed in this paddock on the 7th July, 1911. One died as the result of an accident on the 26th February, 1912; the other was killed by a dog in November, 1912. Neither had developed bush sickness. No control cattle were used in these two experiments, but the farm is well known to be affected with bush sickness, the owner generally having found it necessary not to run young cattle on it for more than eight or nine months at a time without a change.

That the soil-treatment given here did not entirely prevent the development of bush sickness was shown by the fact that of three lambs born of the ewes running in these paddocks with the steers (one ewe proved barren), two out of three died of bush sickness. All three lambs were born about the 15th June, 1911. The deaths from bush sickness occurred on the following dates: 1st January, 1912, and 30th March, 1912. The third lamb remained healthy until fifteen months after birth, when it, with its dam, was killed by being worried by a dog. Lambs are much more susceptible to the development of bush sickness than are any other animals, becoming victims of it on only slightly affected land whereon cattle and older sheep will remain free from it. It was unfortunate that these experiments, so far as sheep and lambs were concerned, were incomplete owing to accident.

It is proposed in the next issue of the *Journal* to give full particulars of each individual experiment in this series, including those which proved indecisive.

The subdivision of the Mamaku Experimental and Demonstration Farm is now about completed. It has been stocked, and all arrangements are well under way for commencing practical dairy-farming on it next season.

N**A****T****U****R****A****L** resources are the nation's greatest asset, and
in this Dominion the individual farmer is the chief
guardian of this capital fund.

SILVER-BEET AS A FORAGE CROP.

ARTHUR P. HOPKINS, Works Manager, Belfast Freezing-works.

AMONGST the various tests conducted at their experimental forage farm at Belfast by the Canterbury Frozen Meat Company in co-operation with the Fields Division of the Department of Agriculture, Industries, and Commerce, during the past twelve months, by far the most important and conclusive was that which demonstrated in a practical form the advantages of growing silver-beet or Swiss chard for topping off and finishing forward store lambs or wethers. From our experience at Belfast I believe it to have many advantages over either rape or kale. It is more quickly grown, recovers quicker from feeding off, is absolutely immune from blight, and, as far as my observation went, no tendency to either scouring or bloating was noticed. The only pest observable was a slight attack of the leaf-miner, which occurred before the first eating-off and did not recur in the subsequent growths.

The stock fed off at Belfast were mainly in the first instance most indifferent low-priced stores (hoggets and two-tooths), but which were eventually killed and sold in the company's butchers' shops at a considerable profit.

The breaks were fed off altogether six times during twelve months. It may be as well to mention here the advisability of feeding silver-beet off quickly and in small breaks, as the sheep eat it so greedily and closely that if they are left on too long the young shoots coming up are eaten right to the roots and the next growth necessarily suffers.

There is no doubt that stock will prefer it to either kale or rape. We found that rape could be fed off at least three times, kale only twice, the third time the stock (owing to its seeding) sulking on it; whereas they tackled the beet for the sixth time as greedily as at the first. The tendency of both rape and kale to blight must also be borne in mind. Had it not been for the long wet spell last winter, during which the retentive clay land at Belfast was too soft to put stock on, I am sure another feeding could have been taken off.

We used about 5 lb. seed to the acre, thinning the plants out 10 in. apart in the rows, and using 3 cwt. of the company's fertilizers per acre. Directly after each feeding-off the cultivator was run lightly between the rows.

From actual weighings, conducted by the Agricultural Department's officers under the superintendence of Mr. Alex. Macpherson (to whom

I believe New Zealand is indebted for first proving the value of this plant as a forage crop), the yield of green stuff grown during the twelve months was 218 tons per acre.^f

From the following table, which applies to one quarter-acre only, it will be seen that the feeding of silver-beet at Belfast equalled the carrying of 1,014 sheep per acre for eighty-four days:—

Feeding.	Dates of Feeding.	Number of Sheep.	Equal to	Quantity of Leaves stripped.
				Tons.
First ..	March 12-22 ..	85	243 sheep per acre for 14 days..	51-72
Second ..	June 30 - July 15	50	214 " "	48-22
Third ..	Sept. 2-13 ..	50	171 " "	30-00
Fourth ..	Nov. 2-9 ..	50	100 " "	27-00
Fifth ..	Dec. 24-31 ..	50	100 " "	26-86
Sixth ..	Feb. 25 - Mar. 1	163	186 " "	34-20
		Totals ..	1,014 " "	218-00

There were three varieties grown—a dark smooth plain-leaved, a very light yellow, and a light curly-leaved plant. Of the three, the first mentioned is the most valuable, from its heavier growth of both leaf and large fleshy stalk, and from its longer abstention from seeding.

ERADICATION OF WEEDS.

A. H. COCKAYNE.

THE statement is frequently made that the expense necessary to eradicate weeds is often so great that it is impracticable to carry out any effective work. This statement is nearly always made in the case of the control of weeds on permanent pasture, where the great factor in weed-eradication, good cultivation, cannot be taken advantage of. The problem of the control of weeds on such land is therefore one of considerable importance. Any expenditure, no matter how great, provided it returns a good interest on the money spent, cannot be looked upon in any way as a monetary loss to the farmer. Unfortunately, too many farmers destroy weeds merely to keep within the Act rather than as a necessary procedure in the economy of the farm. The work should never be regarded as a necessary evil, but as an investment capable of giving an absolutely certain return, often of very much greater value than the time and money spent upon it, at the same time giving a permanent and truly increased value to the property

by reason of the better carrying and selling capacity. It may be well to indicate how much can be actually spent with certainty of profit. On land worth £1 an acre containing 10 per cent. of useless plants an expenditure of over 2s. per acre will be fully compensated if these useless plants are suppressed and their place taken by utility plants. Thus for every £1 value of grazing-land containing 10 per cent. of weeds 2s. an acre can be spent with certainty of a profitable investment; that containing 20 per cent. 5s. can be expended; 30 per cent., 8s. 6d.; 40 per cent., 13s.; 50 per cent., £1; 60 per cent., £1 10s.; 70 per cent., £2 6s.; 80 per cent., £5; and 90 per cent., £10. Thus land worth £38 per acre containing 20 per cent. of weeds can have £9 10s. spent on it for weed-suppression, and then show a direct profit, to say nothing of the permanent gain. From the above it can be seen that the control of weeds on high-class land will always be profitable, but their control on very cheap land will depend upon the percentage of ground occupied by them. Where this is large weed-control, even if the land be very cheap, is probably payable. Thus, for example, land worth £2 an acre containing 60 per cent. of tauhinu can have £3 per acre spent with profit in controlling this weed.

These remarks refer very largely to those useless plants the presence of which is nearly always condoned by the farmer on the plea that it will not pay to deal with them. Of course, with regard to extremely noxious and aggressive weeds, the amount that can be spent depends entirely on the loss in the value of the land that would occur were the weeds left in possession.

With the idea of affording country ministers an opportunity of securing some knowledge of farm work and life, the Agricultural College at Missouri (U.S.A.) has established a short summer course for the clergy.

The results of the manurial experiments on the swede crop at the Ruakura Farm of Instruction up to the present are extremely puzzling, and certainly not what an agricultural chemist would expect, reports the Manager. One of the most even plots and the cheapest as regards cost of fertilizers received a haphazard mixture of basic slag and basic superphosphate. In every instance where sulphur was added to other manures, at the rate of 1 cwt. per acre, the germination was excellent, and the plots at the present moment have an exceedingly healthy appearance. On the other hand, where sulphur alone was applied to the mangel crop, at the rate of 5 cwt. per acre, the result was not so good as that of the no-manure plot. In the early, late, and subsoil ploughing experiments, which cross the mangel plots, the subsoiling at present shows the best results.

RURAL EDUCATION.

WORK IN THE NORTHERN WANGANUI DISTRICT.

AGRICULTURAL education in the district high schools of the northern district of the Wanganui Education Board is being conducted on a sound and original system. Practical field-work is the main feature, and this, being carried out under a capable and enthusiastic director, Mr. R. Browne, is proving an effective means of imparting to the senior boys of the schools in question a good working knowledge of the various processes of rural economy based on correct underlying principles. It is gratifying to know that the lads have been extremely



THE BOYS IN THE MANGEL CROP LISTENING TO A PRACTICAL INSTRUCTION BY MR. R. BROWNE.

interested in the work, and as a consequence many of them are expected to take up farming pursuits in preference to city occupations which have absorbed so many country boys in the past.

Following is a synopsis of the work of this season, the course in each case lasting for a fortnight:—

At Hawera, in early August:—

- (1.) Incubator work; housing and feeding of fowls.
- (2.) Veterinary science, dealing more especially with the dairy cow, and diseases of same.
- (3.) Orchard work: Pruning and spraying of local orchards.
- (4.) Manures and top-dressing; study of pastures.
- (5.) Babcock test; herd-testing.

During the course special attention was directed to veterinary science, to orchard work, and to top-dressing. Veterinary work was taken in the form of lectures, as demonstration and practical work in the field, and at night lantern-slides were used with good effect. Orchard work took on so well that more orchards were available than could be attended to. Farmers are keenly supporting the class in top-dressing, giving the use of their paddocks and finding the necessary manures for use during the coming winter.

At Hawera, in early December :—

- (1.) Shearing.
- (2.) Wool-sorting.
- (3.) Pastures and their treatment.
- (4.) Manuring and sowing mangels, carrots, turnips, and lucerne.
- (5.) Dairy-work: Use of Babcock machine, and lactometer; calculation of added water; herd-testing continued.



MR. T. W. LONSDALE, MANAGER OF MOUMAHAKI EXPERIMENTAL FARM, GIVING
AN ADDRESS ON THE JUDGING OF A DAIRY COW.

Special features in this course were the classes in shearing and wool-sorting. As soon as the lads had sufficient practice, owners freely offered the use of sheds, and allowed the students to shear their flocks under actual shearing-conditions. The lads thoroughly entered into the spirit of the work, working on some days from 7 a.m. till 6 p.m. At the end of the course farmers provided funds, and competitions were held in shearing, wool-sorting, and in milk-testing.

At Moumahaki Experimental Farm, in February :—

- (1.) Weeding and thinning root crops, turnips, carrots, and mangels.
- (2.) Lucerne-growing, also saving of crop as hay or ensilage.
- (3.) The potato : Seed-selection, storing, and sprouting.
- (4.) Study of grass and other trial plots.
- (5.) Selection as applied to cereals—wheat, oat, and rye-corn varieties and strains.
- (6.) Stacking.
- (7.) Veterinary work : Study of cow, horse, and sheep, with special reference to the dairy cow, and diseases of these.
- (8.) Orchard work in season.

The lads were thoroughly interested in their work at the farm, and are anxious to return, especially to carry out winter spraying and pruning operations in the orchard, and later on to shear all the sheep available. For this course only senior boys will be taken—*i.e.*, those between fifteen and seventeen years of age.

The Austrian Government has set aside a fund which provides an annual sum of £250,000 for the development of the animal-breeding industry.

In spite of a plentiful supply of forage at Ruakura Farm of Instruction the dry spell reduced the milk-yield considerably, and the probability is that records will not be so high as those of last season.

The fourth crop of lucerne hay has just been cut at Ruakura Farm of Instruction, and, as it may be reckoned that four crops of hay are equal to six of green feed, the result is very encouraging.

Experiments are being conducted in England to test the value of marram-grass for papermaking. The grass was boiled under pressure when passing through crushing-rollers, and was then bleached. It was found to produce a soft pulp with a short tear, which more nearly resembles the general feel and external appearance of the pulp produced from esparto, or chemical aspen-wood pulp. The primary function of marram-grass is, of course, as a sand-binder; but it is possible that, should it be deemed of sufficient importance as papermaking material, its cultivation will be extended over considerable areas of sandy country. The commercial value of the grass for papermaking has not yet been ascertained.—*Journal of British Board of Agriculture.*

LIME-SULPHUR AS A SUMMER SPRAY.

T. W. KIRK, F.L.S.

THIS mixture has been spoken very highly of in other countries, and has been somewhat extensively tried in New Zealand during the past season, in some instances with deplorable results. Each Orchard Instructor was therefore requested to report as to whether growers in his district had suffered through the use of this spray damaging their trees. The following is a digest of their replies:—

J. W. COLLARD, Whangarei.—Not aware of anybody using it.

N. R. PIERCE, Auckland.—Not aware of anybody using it.

W. C. THOMPSON, Auckland.—Have not seen or heard of any serious damage, but have noticed more or less severe russetting in several instances.

W. R. L. WILLIAMS, Auckland.—Have not come across any damage yet. Very little, if any, of the spray has been used in this district.

T. E. RODDA, Hamilton.—Not used to any great extent. Any damage done seems to have been caused by adding arsenate of lead and by improper agitation.

J. A. CAMPBELL, Hastings.—In some cases serious damage has occurred, while in others very little has been reported. In one orchard a tenth of the leaves and half the fruit have fallen. Good work has been done in controlling pests. More damage seems to have been done by the weaker mixtures than by the stronger.

W. C. HYDE, Wanganui.—To my knowledge no orchardists have used it in this district.

G. STRATFORD, Palmerston North.—One grower estimates the damage at £200 on Sturmers and Washingtons alone. Some trees have been wholly defoliated, and most of fruit has dropped. Another orchard looks as though fire has gone through it, and the best part of the crop was lost.

T. C. WEBB, Wellington.—To my knowledge no orchardists have used the spray in this district.

J. H. THORP, Nelson.—A good deal of damage has been done to orchards, foliage and fruit dropping heavily. Very little good seems to have been done in controlling black-spot. Apparently most damage has been done by weaker solutions.

W. J. COURTIER, Christchurch.—Only one specific case of damage has been reported in this district. The fruit and leaves were badly burnt. Very little used.

E. A. REID, Christchurch.—No experiments have been carried out with the spray in this district.

A. B. MANSFIELD, Timaru.—Very little damage has been reported. In one case, however, some varieties were badly burned. The spray seems to leave a caustic action behind, causing the bark to roughen and shed.

W. T. GOODWIN, Dunedin.—Am not aware of any damage having been done in this district.

In the experiments to determine the influence of manures on the feeding-value of pastures at Ruakura Farm of Instruction superphosphate is still at the top, followed in order of merit by basic superphosphate, basic slag, and no manure.

THE HEMP INDUSTRY.

W. H. FERRIS.

GENERAL DETERIORATION IN QUALITY.

NOTWITHSTANDING the splendid values ruling for high-quality fibre the phormium hemp graded in the Dominion last month was of a most disappointing character. Especially is the position unsatisfactory when it is remembered that the milling plant has been greatly improved during the last few years, thereby making it possible to produce a much freer and better-coloured fibre. The principal cause of the serious decline in quality is, in my opinion, poor stripping, due either to a desire to strip more fibre than the stripper is capable of treating effectively, to careless work on the part of the stripper-keeper, or the employment of inexperienced men. In many cases the phormium-leaf has been merely split, owing to the stripper not being maintained at the correct set, due either to a desire on the part of the miller to rush as much leaf through as possible irrespective of quality, or to carelessness on the part of the stripper-keeper. For the same reason much of the hemp has been bruised, and thereby reduced in strength. The stripping being bad, after-processes have failed to correct the weakness. Where the vegetation has not been properly removed from the fibre, no system of washing or bleaching will ensure a good colour. Where the stripping has been satisfactory the fibre has had in a few cases to be graded down owing to the poor scutching, and bad scutching is often more serious from the cordage-manufacturer's point of view than bad stripping. The latter may leave considerable vegetable matter adhering to the fibre and may cause it to have a poor colour, but the fibre will not be knotted or towy. Of course, it is impossible to properly scutch fibre bruised in the stripping process. The more such fibre is scutched the worse its condition becomes.

It is not forgotten that some mills have badly diseased leaf to deal with—leaf from which nothing but a common grade can be produced; but these mills are excluded from the above remarks. Some of the best mills in the country, having a good leaf to deal with, are turning out the unsatisfactory fibre. Not for six or seven years has such a high percentage of low-grade fibre reached the grading-stores. There is little doubt it is chiefly due to the high values ruling, as the unsatisfactory milling-work became noticeable last November and has continued to the present time, being very accentuated last month. Between the

previous and the present boom the general standard of our fibre was excellent. Certainly, only the best mills were working at the lower values, but these were palpably intent on aiming at quality rather than quantity. Now, as in the previous boom-time, the position is reversed, and everything is apparently being sacrificed to quantity. More money may be made by turning out a huge output of low-grade fibre, which can be sold at a high price, but it is doubtful if it is more profitable even now than milling a superior article, and is certainly against a permanent demand for phormium the reputation of which is being imperilled by the present short-sighted policy.

There is a big demand for "good-fair" fibre, but there is no fibre of this quality available—a matter for very great regret as good-fair has been our standard quality for binder-twine. If this grade is not obtainable, cordage-manufacturers will be compelled to use other fibres for this purpose, to our permanent disadvantage. Australian binder-twine manufacturers would take New Zealand good-fair in preference to Manila, but as the former is unobtainable they are being forced to use Manila. Even our high-pointed fair cannot be used for binder-twine, owing to being too coarse and wiry.

A very bad feature of some lines coming forward is that, evidently with the idea of utilizing every scrap of fibre, some hanks are being "faced" with good fibre, giving the drawn hank the appearance of being of decent quality; but when the hank is opened up for inspection it is found to contain hemp of a very inferior description. This has not occurred for some years, and is to be deplored. At a time like the present it is particularly unfortunate, as the graders are busy enough with a record output to deal with without having to examine more hanks than should be necessary in order to discover if the "facing" trick is in evidence. As a consequence, strict instructions have been issued to the graders to examine the hemp as thoroughly as possible. I am continually expecting to have complaints as to grading, owing to the apparent prevalence of the "facing" deception.

The only districts turning out decent-quality fibre at the present time are Hawke's Bay, Marlborough, and Canterbury. The poor quality is confined to Auckland, Wellington, and Southland districts. Westland fibre is not so bad, but has gone back in quality owing to defective scutching of the tail-ends.

Stripper-slips have in many cases been coming to hand in a damp and even wet condition. A considerable number of bales have had to be condemned in consequence.

Needless to say, tow has been unsatisfactory—its quality is a reflex of that of the hemp. Condemnations on account of bad shaking and poor colour have been general.

THE APIARY.

ESSENTIALS NECESSARY IN ESTABLISHING THE INDUSTRY.

F. A. JACOBSEN.

THE study and practice of beekeeping requires the application of much intelligent thought and energy. To the average man little is known of our fascinating industry, but a perusal of the following brief notes will give a general idea of the various intricacies and scope of the apiary. It is commonly thought that little attention is necessary to be given to bees. This is erroneous, for to get the best results bees must be closely studied, be given considerable handling, and be subjected to many artificial systems necessary to control their work and life. Those most skilled in scientific and practical beekeeping receive the highest remuneration from their labours, and to-day we have numbers of men and women making independent incomes from the toll they receive in honey and various other commercial commodities from their bees. As previously stated, then, commercial beekeeping requires study of all branches of bee-life as well as the most diligent labour.

LOCATION OF FIRST IMPORTANCE.

Those entertaining the idea of establishing an apiary must first look for a suitable location. The etiquette of the bee world prohibits encroaching on another person's site. That is to say, do not place your bees near anybody else's, especially if the other person has fully stocked the district. Find some country rich in clovers and bee-forage that is free from any restriction as above, and there secure a site and establish your plant. It is unprofitable to keep bees in any but a good nectar-yielding district.

STYLE OF HIVE TO ADOPT.

After securing the site it is necessary to select the best style of hive. This is probably the Langstroth, which is used very extensively in the Dominion, and may be purchased at a reasonable price from the dealers. In a specially favourable district it would be an advantage to adopt the twelve-frame size, but for ordinary purposes a ten-frame hive will meet all requirements.

KIND OF BEES TO KEEP.

The bee that is recognized as possessing the best all-round qualities is the leather-coloured Italian, and it is recommended that these be kept and bred as pure as possible. They have yellow stripes across the abdomen, and are very attractive in appearance. The predominant race is known as "blacks," but they do not possess the good qualities attributed to the former kind, and are not so docile. Italians, as a rule, also gather a larger crop of honey. The black bees are superior comb-honey builders, and cap their combs with an air-space between the honey and the wax cap, which imparts a beautiful white appearance to the comb.

PROCEED WITH CAUTION.

In the first instance it is advisable to purchase a colony from some reliable apiarist, and gather from him at the same time as much information as possible. There is nothing like practical knowledge, so proceed with caution to build up your apiary from this hive, and thus gain experience as time advances.

It is impracticable for a novice to manage a large apiary without previous experience, and I warn all those who intend keeping bees to always bear this in mind. Read plenty of bee literature and gain the experience of others, and experiment to find what methods are most suitable to your location.

PROFITS OF THE APIARY.

The chief source of revenue derived from the farming of bees is honey. From individual colonies as much as several hundreds of pounds are sometimes taken. As an instance of good management I may mention an average crop of 179 lb. of honey which was secured by an apiarist in Canterbury. A crop like this, however, is exceptional, and an average of between 50 lb. and 100 lb., taking one season with another, is considered profitable. Some years a very poor crop is secured, while at other times the yield is phenomenal. These erratic changes are due almost entirely to climatic conditions. The careful and watchful apiarist seldom falls below the 50 lb. mark, which, at the price of 4d. per lb. net, works out at 16s. 8d. per colony. One man, with a little help in the busy season, could look after four hundred or five hundred colonies, which under favourable circumstances would net him a very fair income.

WAX.

In every apiary, no matter how carefully managed, there is an accumulation of wax. Cappings as a rule furnish the most, but old

combs that it is necessary to discard, those that become broken and irreparable, combs from colonies that have been treated, burr combs, &c., furnish quite a lot in addition.

These are melted up in various ways, and rendered into pure wax, which sells at about 1s. 6d. per pound. It is difficult to estimate the revenue from this source, but probably 1s. per colony would be about right. Many beekeepers make their own foundation, and in these cases the wax is retained and used for that purpose.

QUEEN-REARING.

Probably the most fascinating yet the most difficult work in the apiary is queen-rearing. Many methods are in practice, and beekeepers invariably experiment with these before finally selecting the plan which is most suitable for their location. In this particular branch of bee-culture the novice is confronted with difficult complications which require much thought to circumvent. Queen-rearing is, indeed, a branch in itself, and many persons occupy their full time in this work. The queens are raised by artificial means, as a rule, and hatch out in separate cages. A number of these cages are sometimes together in one hive, which is called a "nursery." After leaving the nursery they are introduced to what are called "mating-boxes" or "nuclei," from which they take their wedding flight. This single occurrence is sufficient to keep them fertilized throughout their entire life. After this nuptial revelry they are able to lay drone or worker eggs at will, and are ready to be introduced to large colonies of bees that need requeening, and so fulfil their destined mission. A commercial queen-breeder rears as many queens as he has orders for, and has his apiary stocked with especially well-bred bees. Special equipment is also needed for this purpose. Her royal highness is sold for various prices according to her quality, the general price of a first-class fully developed and tested Italian queen being about £1.

SELLING COLONIES.

A source of revenue is derived from the sale of surplus colonies. For instance, an apiary may be increased by swarming or artificial means from seventy-five to one hundred stocks, and if this increase is not desired the surplus colonies are usually sold. In some cases they are left until the winter, when they are united with other stocks, thus forming exceptionally strong colonies that should do well the following year.

FOUNDATION-MAKING.

This branch of apiculture is fast becoming popular in New Zealand, and the time will come when it will be unnecessary to import founda-

tion into this country. The quality usually manufactured, when used for ordinary purposes, is equal to foreign. One apiculturist, who has since retired from business, put through 70 tons of foundation, so there is scope indeed for development in this direction. The latest plant for foundation-making has not yet been imported to the Dominion, but the time will come when machinery of this description will be necessary. A complete outfit would cost between £200 and £300.

PROPER MARKETING.

A lot could be said on this important question, and if the interested parties in the Dominion would co-operate with a view to equalizing distribution, prices would certainly be in their favour. A great deal of improvement has, however, been effected during the last few years, especially in connection with the export trade. The President of the Federated Association of Beekeepers, Little River, Canterbury, has arranged for the export of 12 tons of first-grade honey monthly, and those desiring to ship under advantageous conditions should communicate with him without delay. All produce going through this channel will be graded by a Government expert, as would other shipments should application be made to the Department.

INDIVIDUAL YIELDS.

A hobby apiary of five colonies of black bees at Eltham produced this season almost 700 lb. of superior-grade honey, exclusive of the final extracting. Many other small apiaries have done equally well.

RETURNS FROM FRUITGROWING.

W. R. L. WILLIAMS.

THE high returns possible by fruitgrowing from a comparatively small area of land are undoubted. The following instance recently came under my notice: A small Auckland orchard of $3\frac{1}{2}$ acres, of which not more than 3 acres are in stone fruits, has had an output this season of 55,000 lb. of stone-fruits (mostly peaches) actually marketed. Practically none of this fruit was sold under 2d. per pound, whilst the early peaches were sold at a high rate. However, allowing only 2d. per pound, the gross return would be £458, equal to over £152 per acre.

“Weeds are the farmer's best friends,” says an American writer. “They force him to cultivate; and lack of cultivation is the crime of modern farming.”

RESULT OF GOOD MANAGEMENT.

L. BOWMAN.

THE accompanying photograph is one of the evidences to be seen on a plant in the Canterbury District of the application of modern methods applied by an apiarist imbued with enthusiasm and never sparing in his energy. The apiary was established at Fendalton three years ago with about twenty colonies, which were increased to seventy-two at the beginning of the present season. With the object of establishing his hobby as an independent business, the owner, Mr. R. M. Gidley, removed the plant to the Ellesmere district. At this time all the colonies were in a very weak condition owing to unfavourable weather-conditions; but, notwithstanding an adverse spring, Mr. Gidley has by dint of unremitting but intelligent work built up large powerful colonies to the number of 100, all provided with ample stores to carry them through the coming winter. The photograph shows a typical colony which from a weak foundation has been built up into a hive providing 417 lb. of honey. Besides the take from the apiary—which is very creditable, 4 tons 17 cwt.—2,100 combs have been built out from foundation. At $4\frac{1}{2}$ d. a pound, at which price the honey is being sold privately, the return from the young business is under the circumstances a speaking example of what can be done by a keen amateur developing his hobby into a commercial undertaking with expanding knowledge.



In 1911 Austrian co-operative associations having as their object the purchase of fertilizers and feeding-stuffs were subsidized by the Government to the extent of £5,300.

ORCHARD WORK FOR MAY.

W. A. BOUCHER.

AUTUMN PLANTING.

IN some districts the month of May frequently proves suitable for autumn planting. Many growers prefer autumn to spring planting of orchard lands. Much, however, depends upon the nature of the soil and climatic conditions of the season whether autumn planting is desirable or otherwise. Two most important considerations are the nature of the soil and its condition when the setting-out of an orchard is contemplated. In the case of light, free, well-drained soils planting may be carried out in spite of showery weather sometimes experienced during the months of May and June, but in the case of moisture-retentive clay lands, even when well prepared, the rainfall will at times reduce the land to such a saturated condition that planting should be deferred until spring, when, with dry warm weather, the soil will have become friable again and suitable for working. Should fruit-trees ordered in the early part of the season come to hand when the land is not in a satisfactory condition for planting, they should be heeled in for the time being, to be lifted again and planted out when the soil has become moist and friable.

PRUNING.

In some districts of the Dominion the pruning of orchard-trees may now be commenced with advantage. Instances have occurred, however, where heavy winter pruning has been commenced when the trees were still in full foliage and the leaves green and fleshy. This practice is one that cannot be recommended, as in time the removal of a large quantity of vigorous foliage would react seriously upon the vitality of the trees.

LEMON-CULTURE.

Recently lemons have proved a very profitable crop, the returns received by the grower being entirely satisfactory. This fruit is one well worthy of cultivation in the warmer districts of the Dominion. In suitable soils and localities lemon-trees grow freely and come into bearing at an early age, provided that they receive the necessary cultivation and the treatment required for the control of the pests and

diseases to which they are subject. All of these can be both easily and economically kept in check if the necessary measures recommended by the Department are adopted. One disease, due to attack by the fungus commonly known as "brown-rot," requires the attention of growers during the month of May, and certainly not later than June. "Brown-rot" first made its appearance in New Zealand in the year 1908. Unlike many other parasitic fungi which require moist warm weather for germination and dissemination, the fungus that causes brown-rot thrives in cold wet weather. For this reason it is necessary to adopt preventive measures not in the early part of the season, as is usually the case with diseases of this class, but in the latter part shortly before winter weather sets in. A treatment that has been proved to be thoroughly effective is to apply around the trees a soil-dressing of pulverized sulphate of iron, at the rate of 1 lb. to 4 lb. per tree, according to size and age of the trees. This should be scattered beneath and round about the trees and lightly worked into the soil. The object of this is to, as far as possible, destroy the spores of the fungus, which during the summer months remain dormant, only to become active again when winter weather is approaching. To further protect the crop the trees should be thoroughly sprayed with the Bordeaux mixture, 4-5-50 formula.

Provided the trees are kept healthy and vigorous, successful results in lemon-culture depend mainly upon the careful handling of the fruit. There is perhaps no other fruit that requires such careful preparation for marketing. Lemons should be gathered not according to ripeness but according to size, a diameter of $2\frac{1}{4}$ in. producing a lemon which when cured will realize the highest market value. In order that lemons may keep, cure, and carry well, every care should be taken to avoid bruising when gathering from the tree and in the necessary handling afterwards. It does not appear to be generally recognized by growers in the Dominion that lemons carefully handled and cured will keep in excellent condition for some months, thus affording an opportunity for supplying the markets when the fruit is most in demand and values correspondingly high.

SPRAYING PEACHES AND NECTARINES.

In some of the colder districts of the Dominion peaches and nectarines will have shed their leaves before the end of May. In order to protect the trees from attack by the fungus *Clasterosporium carpophilum*, commonly known as "die-back," they should be thoroughly sprayed with the Bordeaux mixture, 10-10-40 formula. This is desirable because "die-back" fungus attacks during the winter months the bark and buds of the young twigs of the season's growth—that is, the

fruiting-wood of the following season. From this it will be seen that prospective crops of peaches and nectarines depend very largely upon the care bestowed in keeping the trees free from the disease. It is to be noted that the strong winter formula of the Bordeaux mixture recommended above is not to be applied to the trees until they have shed their leaves.

GRAPE - CULTURE.

S. F. ANDERSON.

VINE WORK FOR MAY.

DURING the past month many growers experienced the common trouble of their grapes rotting, and in more than one instance this vexatious trouble has been put down to disease. It is not so, however. The matter has been carefully investigated by the Biologist of the Department, Mr. A. H. Cockayne, who states that "The only fungi present are saprophytic ones that would appear as soon as the grapes begin to rot, and they must have commenced to rot through having water on them." The trouble is more noticeable where the bunches have been imperfectly thinned, thereby preventing the water or moisture condensed on them from going through the bunch, or drying up. It is easily avoided by keeping the bunches more open.

The month of May is a quiet one so far as cultural operations are concerned. The renovation of old vine-borders (advised in the notes of the February issue) may now be proceeded with, provided they are not too dry or that the weather has not been continuously dry for some time. In this case, wait for rain.

GROWING OUTDOOR GRAPES.

As a branch of horticulture grape-growing has reached an important stage in this country. Although grapes are never likely to form an article of export, it has been conclusively shown during the last two years that local consumers can be supplied without the necessity of importing them from other countries, and this at reasonable prices. The production of good fruit, however, is capable of much greater extension. It would be better, too, for the production of the best outdoor table-grapes if the work were confined to small holdings—say, from 1 to 5 acres in extent—and if these areas were cultivated in a thoroughly up-to-date manner. Only in this way can the business be made to pay. It is most important that the site chosen should be on

hill country, preferably on well-drained slopes lying to the sun. This cannot be too strongly impressed on those intending to embark in the business. The quality of the soil for the vineyard is not so important a matter as the choice of locality, and it may be at once stated that all parts of the North Island are not suitable for the industry. The rainfall varies considerably, and this must naturally influence the grower in choice of district. Hawke's Bay, especially the southern portion, is the best in that respect. There are, however, many other places on the eastern side of the North Island that are eminently adapted for the purpose.

The following varieties have proved suitable for growing outdoors for table purposes:—

Black: Black Hamburgh (early), Besgano Nero (mid-season), Muscat Hambro (mid-season), Chasselas Rose (early). White: Golden Chasselas (early), Chasselas de Fontainebleu (early), Foster's Seedling (early).

All the above are European varieties, and can be grown on espalier fences in the same way as the wine-grapes.

Albany Surprise and Pierce: American (mid-season). For the culture of these see leaflet No. 11, New Series.

MANURING OF THE VINEYARD.

Some vinegrowers do not manure their vines until they notice a falling-off in the general growth and bearing-capacity. They should not wait to be reminded of the want of plant-food in this way. It is obvious that where a considerable weight of plant material and ripe fruit is taken away some return must be made. It is one of the inexorable laws of plant-cultivation that sooner or later a return to the soil must be made for the annual tax upon it. In the case of vineyards, a green crop, such as horse-beans, field-peas, mustard, rye, or in fact any crop of green stuff that can be ploughed in and gives the least trouble afterwards, should be grown every few years. In the intervening years it can take the form of well-rotted stable manure, bonedust, blood-meal, or artificials suitable to the particular soil. Most hill country is deficient in phosphoric acid, so that phosphatic manures are the best for such locations. The quantity applied should not exceed 2 cwt. to the acre. Sulphate of ammonia and nitrate of soda are more fitted for vegetables and cereals, and should not be used for vines. Slow-acting manures are the best. April is the time to commence this work.

Whereas there were only thirty-nine agricultural credit societies in Russia in 1909, the number increased to 107 by 1912.

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

ALTHOUGH we cannot change winter into summer, yet we can, by the exercise of a little care and thought, ameliorate winter conditions to a considerable extent. Hoeing is done in summer-time partly to destroy weeds and partly to preserve a fine surface that will act as a mulch and prevent evaporation of moisture. A fine surface during summer does not prevent ingress of air, which is very essential to the growth of plants, but a like condition during winter, when there is a greater rainfall and less and weaker sunshine, would not tend to encourage such growth as we have reason to expect and desire. It is also obvious that a rougher surface will expose a greater area to atmospheric influences, and is therefore most beneficial at this time. During summer-time one grows lettuces in deep drills, so that the roots are well away from the dry surface soil; in winter raised beds are the natural position. A trench a spit deep thrown out around a bed will tend to dry the soil even though there be no outlet for water, and such a thing is often very beneficial to growing crops, and particularly to beds containing seedling cabbage, cauliflower, lettuce, and onions. On some soils these precautions are not necessary—that is, where drainage is perfect and the soil light or porous.

Deep cultivation is necessary to ensure uniform success. Where the soil is heavy deep working is necessary to allow water to sink down in the rainy season, and also because when water lies near the surface during wet weather such soil is nearly always abnormally dry when rainfall becomes light, and unless roots get deep down the plants suffer from drought. On the farm this condition is met by subsoiling, but the improvement is only temporary, and insufficient for continued cultivation. When the site of a vegetable-garden is a fixed one, measures must be taken to meet the requirements of the various crops as well as the variations of weather. Soil naturally becomes worn by constant cropping. It also loses humus. Both losses must be compensated for. Shallow soils and also those that lack humus may produce fair crops while rain is frequent, but fail to give adequate return when dry weather sets in. Deep cultivation and restoration of humus is the only remedy under these conditions. Farmyard and stable manure is the only perfect manure for constant cropping. It supplies nearly all

the fertilizers wanted, while it provides humus, without which plants will not thrive. By darkening the soil it increases its warmth, for anything of a dark nature absorbs heat, and light colours reflect heat. It increases moisture in dry weather, and generally effects improvement in working and makes for the congeniality of the soil as a rooting-medium. When large quantities of this kind of manure are not available it would be unwise to bury it deep down; it would be better, too, when trenching to work in any garden or farm rubbish (such as the bottom of hay or grain stacks, or cleanings of roadsides and ditches) into the lower strata of soil, and keep the good manure for the top; but be very careful not to work in anything in the way of wood (such as gooseberry-prunings, or hedge-clippings containing firm wood), for they fill the soil with fungoid growths that are inimical to plant-life. All such rubbish should be burned.

Cauliflower-plants for spring planting are in some places somewhat difficult to raise. This is particularly the case in low-lying places subject to frost. Usually all goes well for the first few weeks; then they begin to damp off, or cease to grow. To a large extent raised beds remedy this evil, sometimes entirely so; but some protection is at times imperative to ensure good plants. There are several ways of raising plants. Some sow the seed in boxes under glass. I think this plan a bad one, because at this dull part of the year such treatment is more than likely to result in soft plants. I prefer to sow in the open. Let the plants remain there till they show signs of stagnation; then lift and prick off into boxes. Put these under glass, but keep the glass off on all fine days. When the plants have become large enough for planting out, the boxes should be placed outside in a dry situation to harden off before finally planting them out.

Cabbage-plants should be pricked off into new beds as soon as they are large enough to handle. The site of the beds should be in a well-drained position and be raised above the ordinary level. Prick out the plants about 4 in. or 5 in. apart. Dealing with the plants in this manner provides a stocky plant, and also accelerates their growth, and that to such a marked degree that when these are finally planted and in good growth those in the original bed will have been so much retarded by crowding each other as to provide plants for a successional bed.

Sowing *cabbage*, *cauliflower*, *lettuce*, and *onion* was previously advised as work to be done at the beginning of this month. If such has not been done, neglect it no longer. In some places turnips may be sown up till May. This will be in fairly dry and sunny situations. I have sown *carrot-seed* during the latter part of April, but it is seldom worth while to do so. The only valid reason is that it continues the supply till the latest possible date in spring. Thus any one having an imperative call for carrots for flavouring all through the year will find that these

late-sown ones will go to seed a little later than the matured roots, and the difference is usually just enough to enable them to last out till the first little ones from spring-sown seed are ready.

Winter crops of the Brassica family, which includes *cabbage* and *broccoli*, should now be so far advanced as to have covered all the ground about them, and weeds will be no trouble; but other crops, such as *parsnips*, &c., are sure to get infested. The weeds should be pulled or dug out and wheeled away to the heap. Sorrel and couch, when in such positions, increase rapidly during wet autumn weather, and if neglected are likely to cause much trouble hereafter. It is, however, no easy matter to dig the roots out from among parsnips and carrots. The best way to deal with them is to clean the ground as the crop is used. The crop should be dug systematically, not by digging roots here and there, but by beginning at one end of a bed and digging clean, turning the soil over properly and digging in the trimmed-off tops, leaving the ground neat and clean where the crop is used. The same remarks apply to celery-trenches. If these are left rough till a trench is cleared out, it is quite a task to level them down among the rubbish: whereas if it is done in a workmanlike way from the start it is no trouble at all. The first spit in digging out a root should go to the hollow side and forward. In the hole that is left the trimmed-off tops should be put. Digging the next head covers the debris of the first and levels the ground, so that when the last has been dug the whole ground is level, all the debris is buried to enrich the soil, and much labour is saved.

SMALL FRUIT.

If seed of *Cape gooseberries* has not yet been sown, as previously advised, it should be sown at once. Sow in boxes under glass, or, if there are no frames available, stand the box in a sheltered, sunny corner, and cover it with a sheet of glass. It is not a good plan to wait for chance plants to spring up in the garden. They do not develop early enough to ensure a good crop the first season. A word of warning: If seed is to be purchased, obtain the Cape gooseberry, not the variety called *Francheti* (Giant Japanese). The latter is a highly ornamental plant, but the fruit is not palatable, although it is advertised as edible, and is recommended for preserves.

Raspberry plantations may well be put in order now. There is more than likely some necessity for clearing them of weeds, and it is well at the same time to clear out the dead canes and surplus suckers. It is useless at this season of the year to hoe weeds. They must be pointed in, or dug out, as their nature requires. After the plantation is made clean, a dressing of farmyard or stable manure should be given. If artificial manure is to be applied, it had better be delayed for a couple of months. The kind and quantity will be given later.

Gooseberries and *Currants*.—It is unlikely that the annual pruning will be undertaken yet, but weeds may demand attention, and in that case it will be an advantage to the work to remove any straggling branches there may be, and, in the case of gooseberries, to shear off the drooping ends of branches, so as to render it easier to work around the bushes. A mulch of manure around and beneath the bushes will keep the ground clean as well as manure them.

Where *strawberries* are to be manured by a mulch of manure, it may be put on at any time. It is best done some weeks in advance of growth, so that the fertilizing properties may become washed out and into the soil, the debris remaining clean as a check to weeds and protection for the fruit from dirt. Doubtless some of the manure will be leached through the soil, but there is also loss in other ways if it is kept till spring.

THE FLOWER-GARDEN AND TREE-PLANTING.

Planting *roses* may be taken in hand now. The planting season extends from the middle of April until the middle of July in an ordinary way, with a still further extension in cases of necessity for a further period of about six weeks. Autumn planting is to be preferred, for the reason that as the bushes become re-established before winter they are in a condition in spring that enables them to break away strongly and more vigorously than those planted in spring can do. There is one great difference in treatment to be observed in autumn planting—that is, there must be very little pruning done at the time of planting. Straggling branches may be shortened to some extent, and soft shoots—late and immature growths—may be cut out. Beyond this the bushes should be planted as they are when lifted, the object being to retain as much foliage as possible, as the foliage is necessary to promote the formation of new roots. If this were not accomplished it would be better to leave planting till a later date. The object of shortening branches as described is twofold—first, to relieve the depleted roots of undue strain; secondly, to enable the plants to stand firm by the removal of some of the top hamper, which if left on would give wind too much play on them. New roots cannot form unless the bush stands firm. It is important that the soil should be tramped firmly over the roots, not only to keep the bush firmly in position but also to ensure that all roots are in close contact with the soil, a very necessary condition to the formation of new roots. It is of equal importance that the surface soil shall be quite loose, so as to enable rain and air to readily penetrate. *Roses* are commonly reputed to do best on clay land. Doubtless this is to a large extent misunderstood. They do better in heavy soil than in that of a very light character, and in such soil they are benefited by an addition of clay—that is, clay of a kind.

The character of clay that is useful in such soil is sticky, puggy clay : not the marly kinds. Where the soil is naturally of a heavy character it may not be fit for treading down hard, because it might become a stodgy mass. When this is the case it is advisable to provide some lighter material to put over the roots when planting. The importance of firmly treading in the soil around newly planted trees and shrubs is often underestimated. It is really one of the most important factors in successful planting, and for quite opposite reasons in different cases. Suppose a tree or shrub is moved with a ball of earth attached, this ball of earth will be more or less hard according to the nature of the soil. A hole is prepared for the reception of the ball, and refilled when the tree is in position. Now, unless the soil that is returned is made quite as solid as the ball of the tree, water will centre into the loose soil and never penetrate the ball. The tree then dies of starvation when dry weather sets in. In such cases the soil should be trodden or rammed very firmly, the surface left loose, and the final filling should be done so as to leave the bole of the tree standing in a shallow cup—the lowest part, in fact—so as to direct rainfall to the ball of the tree. The opposite case is when a plant is put in that has no ball of earth. firm treading is just as necessary then to prevent an undue soakage of water to it, as would happen if the soil about it were looser than that in the surrounding plot.

Planting trees and shrubs of almost all varieties may with advantage be done in autumn, but some knowledge of local conditions is necessary in some cases. Where the soil becomes very cold and wet during winter it will probably be better to delay the work till spring, for it is not probable that trees can make new roots in cold, wet soil : and unless they do so the trees must perish. Early-autumn planting is the only alternative to waiting for spring in such cases. There is no doubt about the advantage of planting in autumn wherever possible. It practically means gaining a year.

THE CARE OF NURSERY PLANTS.

Many failures are experienced for want of proper treatment of young trees, &c., received from nurseries. There is a certain shock to young trees that are transplanted that is quite unavoidable. They also suffer somewhat during the period in which they are on the journey from the nursery to the planter. There should be a short period allowed in a suitable place for resuscitation before planting, or losses are sure to follow on sudden exposure to all the vagaries of wind and weather. My own plan is to unpack immediately on receipt, and heel the plants in a somewhat sheltered place in free soil. Heeling is done by throwing out a shallow trench to begin with, putting the soil on the side of the trench opposite the digger. A row of plants is laid close together,

the roots in the trench and the plants resting against the bank of soil thrown out. Now dig in soil to cover the roots, and at the same time form another trench; but before completing the next trench tread the soil already thrown over the roots of the first row; this will raise the plants from the ground a little, but still leave them reclining from the upright. Now finish the next trench, throwing the soil forward over the trodden part, but leave this layer loose. The plants are to be left here several weeks until they show signs of new growth. They will then have made new roots and may be safely planted out. When these precautions are taken there are seldom many losses—in fact, I have handled thousands, and have only had units of loss.

SPRING FLOWERS.

Plants raised as advised for this purpose should now be ready for planting out. Wallflowers make the finest show when massed either in beds or on borders. A solitary plant here and there is not nearly so effective as a group. Colours should be grouped separately, or arranged in bands and masses in beds. Very beautiful beds can be made by a judicious arrangement of colours. The yellow and white annual *Bartonia aurea* would make a good edging for a bed of dark-coloured wallflowers. Seeds of *Bartonia* can be sown when the wallflowers are planted. They soon come into flower. Forget-me-not edged with white arabis is effective. Plants of both would be required. Beds of anemone might be edged with *Alyssum minima*, whose white flowers would not clash with the various colours of the anemones. Antirrhinums, particularly the dwarf kinds, make good early beds, and are past their best in time for summer bedding—that is, if they are good plants now. Most hardy annuals may be sown at once, also pansies. Where there are bands of *Lobelia* that it is desirable should be moved, a few clumps should be heeled in in a nurse bed. They will provide a nucleus for propagating from in spring. Iresines and *Altenanthera* should be lifted and put in boxes away from frost.

If up-to-date scientific, agricultural, educational, and household methods were applied on the farm, in the school, and in the home, each farm in Canada would be capable of supporting at least ten times as many persons as it now supports, and maintain them in a condition of comfort if not luxury. At the same time, the productive power of the soil would constantly increase; the drudgery of indoor and outdoor farm-work would almost entirely disappear. There would be ample time for rest, reading, and recreation. Country children would receive as good an education as their city cousins. An attitude of appreciation of rural life would be engendered.—*Dr. S. B. Sinclair, Dean of the Faculty of Education, Macdonald College, Quebec.*

THE POULTRY INDUSTRY.

F. C. BROWN.

MAY WORK.

It is full time the breeding operations were planned, for it is always a safe rule to be well prepared and have everything in readiness if success is to be assured. Of course, I am only referring now to early hatching, to the breeding of birds for autumn and early winter laying. Hatching operations should certainly not commence before July, as birds of the heavier breeds hatched then will come on to lay on the rising egg-market. While this is so, preparations for the important work should be got under way in May. The breeding stock should, even now, be on the proper diet, a healthy blood-clearing ration with nothing to unduly force the birds to heavy laying. The cock bird should also be got into vigorous condition. Green stuff, grit, fresh water, are all essentials to making the birds fit, while it is very desirable that at this time the breeders should have some range, and thereby an opportunity to secure the desired exercise. It should be unnecessary to emphasize that if vigorous and profitable stock are to be bred—and it will only be profitable if it is vigorous—it can only come from parents of sound constitution in perfect health and condition at the time of mating. The parents at this time demand the most careful treatment not only in the matter of diet, referred to above, but should be comfortably housed without being coddled, and by good shelter and in other ways be given every opportunity to conserve their virility in view of their important work when mating takes place. It is useless having a strong male in the top of his form and the females in poor condition, and *vice versa*. The other day I saw a young imported cockerel penned by himself alongside a wire-netted run of pullets. The untiring activity of the young sire, racing up and down the pen, was enough to bring him to a dangerous state of exhaustion in a week. With such treatment the bird was being rendered useless for breeding. Male birds should be kept by themselves well removed from the sight of the fowls, but it is advisable to keep young cockerels with a few old hens. Even when a male bird, through going off, has to be taken out of a breeding-pen, it is a mistake to place him in solitary confinement. He will exercise more and eat better if given the company of one or two hens. The feeding of the breeding-pen cannot be too liberal. Too often poor

fertility and unsatisfactory stock are the result of spare feeding of a breeding-pen, owing to a good cock bird being too solicitous for the hens in allowing them to have all the feed. Of course, while the diet should be liberal it should be plain. Records are of no account in breeding operations. It is the record of fertility and percentage of vigorous stock produced that should be the objective. Too often we hear of incubating and brooding troubles which could all be put down to mismanagement in the breeding-pen.

It is generally recognized now that the late moulter, if of the desired type, is the bird to breed from, a principle I have long advocated and heartily subscribe to; but if the late moulter is to be bred from it should not be put into a breeding-pen immediately after the moult following its long and exhausting laying season. The best plan is to force the selected birds into a false moult, in the direction of changing the feed from wheat to maize or oats. The moult having been brought about, they should then be liberally fed on a plain and nutritious diet, so that the stamina of the birds may be built up before mating.

The quarters for the breeders should be as clean and sweet as possible. It is not always possible, however desirable, to keep the breeding-pens for their special purpose, therefore the houses and runs to be used for the breeders should now receive a thorough cleansing. Abundant scratching-material should be provided. This is an excellent means of inducing exercise, the best way of all of building up bodily vigour. It is advisable in poultry-keeping to neglect no detail in regard to cleanliness, proper feeding, and general management, but with breeding stock this attention to detail is imperative.

ADOPT BUSINESS METHODS.

How few people there are, especially those who keep poultry as a side line, who really know whether their birds are paying them or not, much less know which are the money-makers and which are the wasters. It is coming to this in dairying: that the farmer who does not know exactly the amount of milk each cow in his herd is producing every year will have to retire from the business. While it may not be possible to keep a record of every fowl on the plant, still an intelligent study of the birds will enable one to decide which are profitable and which are unprofitable. This knowledge is necessary to reduce the cost of production and make the keeping of fowls really profitable. The profit-and-loss standpoint will never appeal to the poultry-keeper unless he acquires the habit of keeping a strict account of his receipts and expenditure. When he realizes, for instance, that his returns have declined he will be impelled to look for a cause, probably finding it in having too many old hens on hand, having bred from a weak cockerel, or not having been particular enough in regard to feeding and managing

the birds to the best advantage. It is surprising how contented people become with poor results when they fail to closely examine the financial side of the business. A simple poultry account-book can now be obtained for a shilling, and with this carefully kept it should be easy enough to ascertain at a glance whether the poultry is a paying or a losing transaction. If the latter, then something is radically wrong, for with the type of bird now available at cheap prices from the plants of the Department there is no excuse for want of success. The only explanation that can be offered is want of knowledge or carelessness on the part of the owner.

THE DEAR-EGG SEASON.

We are now right into the dear-egg season. The production of eggs at this time of year is quite artificial. Therefore the fowl bred out of her natural season must be treated in an exceptional manner. Of course, it is the pullet which must be mainly depended upon for eggs at this time. Bred at the right season and managed to the best advantage up to the present, she should be laying now at top if every favouring condition is present. There must be no weak link in the chain. The reason some fail and others succeed in securing eggs when these are most valuable is because in the one case some essential factor in management has been neglected, while in the other case the birds have been handled to the best advantage right through. Having the desired heavy egg-producing strain, hatched in the right season, is only one essential requirement. The birds should never have had the slightest check in the process of development. Then when they are about to lay they should receive liberal food of the best quality, and, above all, be properly housed, preferably in a roomy open-fronted building in which they can remain on cold and wet days and yet have ample exercise by scratching in litter. Dry feet with hens is just as necessary to their well-being as with human beings. It must be remembered that I am now speaking of the artificial high-type layer bred to lay when we want her to and not when her nature dictates. It goes without saying that animal food at this time of year, especially in the colder localities, is imperative. Where fresh meat cannot be obtained meat-meal may be used, as well as blood-meal employed with care, while there is nothing better than milk, and where this is not obtainable on an economic basis skim-milk may be used to advantage. If any argument be required to prove the necessity of this special care of the laying-fowl in the dear-egg season it is surely contained in the fact that, notwithstanding the greatly increasing number of egg-record stock distributed throughout the country and hatched (by artificial means at the right time) eggs are still dear at certain seasons, certainly much dearer than they would be if all the birds hatched to lay now

were doing their duty. This emphasizes the fact that a high percentage of these birds have not been properly managed. Hatching the winter layer at the desired period does not mean that winter eggs will be secured. It is only one factor. More depends on the subsequent management, especially at the laying-period, when everything in nature is against the bird laying.

I realize that the farmer, or his wife, who has studied egg-production on right lines experiences a greater difficulty every year in securing the necessary broodies, for the more the egg-yielding power of the flock is improved the greater becomes the tendency for the brooding propensity to diminish. The only thing to do is to go in for a small incubator or purchase day-old chicks from a reliable breeder. The difficulty, of course, will not be so great with the heavier breeds, but if the laying strains of these be secured—and they are the only types worth bothering with—the question of securing broodies will become almost as great as with the special egg-producing breeds, such as White Leghorns. The time is coming when natural rearing will be almost eliminated from successful poultry-keeping. While it is the specialist now, incubating only by artificial means, who produces the great bulk of the winter eggs, before many years are past it will be the farmer who will be responsible for the main supply. Before this comes about, however, the methods of the specialist will have to be adopted by the farmer.

THINGS TO REMEMBER.

Do not starve your birds because they are not laying.

Do not have the birds standing about in a wet yard waiting for the morning meal.

Feed the layers in the house if this is, as it should be, roomy and well provided with litter.

Aim at making a high average profit from the flock rather than an exceptional return from a few.

The yolk of eggs may be made a deeper colour by feeding lucerne, clover, or watercress.

The moulting bird should be specially well fed. She has gone through an exhausting laying-period, and if early eggs are to be expected from her she should be done well now.

The wasters, which can generally be distinguished when quite young, should be weeded out without delay. Always bear in mind the food bill, the most serious factor of the business. Many hens die in debt to their owners; if they had been culled at the right time the boot would have been on the other foot.

CO-OPERATIVE EXPERIMENT RECORD.

SOUTH ISLAND.

A. MACPHERSON.

NEW VARIETIES OF PLANTS UNDER TEST.

THE following new varieties of seeds of roots, forage plants, and clovers, introduced by the Fields Division of the Department of Agriculture, Industries, and Commerce, are being used in connection with the South Island co-operative experiments of the 1912-13 season:—

Kohl-rabi (from Barteldes Seed Company, Lawrence, Kansas).

Early White Vienna; *Early Purple Vienna*.

Swedes (from Portland Seed Company, Portland, Oregon).

Bangholm Pajbjerg, Improved Danish Purple-top.—This variety was awarded a first-class certificate by the Danish Government for heaviest yield, having given 49 tons per acre. In shape it is a little more elongated than the Globe types. This variety is recommended as the best of its class.

White Sweet Russian.—This variety is excellent either for table or stock. It grows to a very large size. Flesh white, solid, of a firm texture, sweet and rich. An excellent keeper.

Swedes (from D. M. Ferry and Co., Detroit, Michigan).

Hartley's Bronze-top.—A very large, oval swede, with very short neck. The colour of the root is yellow, with bronze-green top. This is a favourite sort in Canada, and can be depended upon to give good results.

Universal, or Canadian Gem.—Roots nearly round, purple above ground, yellow beneath. Very small in top and neck. Flesh yellow, and of excellent quality. Exceptionally hardy and vigorous. Sometimes sold as "Century."

Perfection White.—Absolutely neckless. Tops small, strap-leaved. Flesh white and unusually fine-grained. Vigorous in growth, and usually yields better than the yellow-fleshed sorts. While valuable for stock-feeding, the white flesh is so excellent in quality that it is particularly desirable for table use.

Yellow Swede.—Shape oblong; dull reddish colour above ground, but yellow underneath; is hardier than the common turnip, and will keep solid until spring.

Swedes (from Montgomery and Co.).

Springwood Purple-top.—Globular shape, small top; very fine, firm flesh.

Edina Purple-top.—Hardest of all. Brownish, thick, leathery skin, resisting severe frosts. Particularly free from mildew and finger-and-toe. Rich juicy flesh.

Triumph Purple-top.—Extra fine selection from Drummond's Improved Standard. Large-growing variety.

Hartfield Bronze-top.—Globular shape, small top; grows great size with neat tap-root. Flesh deep-golden colour.

Mangels (from Portland Seed Company, Portland, Oregon).

Danish Sludstrup.—This new mangel comes highly recommended. Our seed is direct from the originator. We give his descriptions, as follows: "Long, reddish-yellow, grows well above ground, and is easy to pull. Has repeatedly been awarded a first-class certificate by the Danish Government, and is doubtless the best mangel in the world."

Danish Red Giant Eckendorf.—Is of straight, cylindrical form, very blunt, and grows mostly above the surface. Awarded a first-class certificate as a very heavy cropper.

Yellow Giant, Intermediate, or Gatepost.—Roots very large, growing over one-half out of the ground. Flesh white, sweet, and tender; tops bright-green, comparatively small; neck small and short. We think this is perhaps the best of the yellow-fleshed beets, because its fine flesh never becomes woody, and its roots grow so well out of the ground that the crop is easily harvested. An enormous cropper.

Carrots (from F. H. Brunning Proprietary (Limited), Melbourne).

Querande or Ox-heart.—This stump-rooted carrot is a decided advance in shape. It is intermediate as to length, between the half-long varieties, such as Danvers, and the Shorthorn carrot, but much thicker than the latter, attaining at the top from 3 in. to 4 in. in diameter. It is of very fine quality for table.

Summer Favourite.—A splendid half-long sort, producing handsome bright cochineal-scarlet carrots early in the season.

The Gem.—A splendid variety. The roots average 4 in. to 5 in. in length and about 3 in. in diameter, although they have been grown to nearly double these dimensions. Quality first rate, being very tender, with almost an entire absence of core.

Silver-beet (from F. H. Brunning Proprietary, Limited, Melbourne).

Swiss Chard or Silver (plain).—Habit erect and vigorous. The midribs are silvery-white and very large; they should be served as asparagus, and the remainder of the leaves make a very valuable dish dressed as spinach. This beet is reproductive, and will bear frequent cutting, but the roots are not edible.

Swiss Chard or Silver Lucullus (curled).—This new variety grows to a height of 2 ft. to 2½ ft., and produces very large crumpled leaves on stalks as thick as rhubarb. These stalks are delicious when cooked and served in the same manner as asparagus. The leafy portion of the foliage, which is cooked and served in the same way as spinach, is very tender and of fine flavour.

Alfalfa or Lucerne (from Portland Seed Company, Portland, Oregon).

Dry-land Alfalfa.—This new Dry-land alfalfa is said to produce large profitable crops of hay and excellent pastures on the high dry lands of eastern Oregon, Washington, Idaho, and Utah. Dry-land alfalfa is especially recommended for the hills and plateaux where irrigation is impossible. It comes from the highest, driest, alfalfa sections, and is declared to be very superior seed.

Turkestan Alfalfa.—Will produce, it is reported, a luxuriant growth in the driest and hottest sections in America without irrigation. It is perfectly hardy, and will stand extreme cold in winter without harm. It yields a very heavy and rich crop of hay and makes a permanent pasture. We have the genuine imported seed.

Clovers (from Messrs. Laing and Mather, Kelso).

Wild White Clover.—The effect of Wild White clover in pastures seems to be that it has a fining influence on the other grasses: cocksfoot, for instance, not being half so rank as when sown ordinarily. It is a slow grower, and does not show much in the first year, but in the second year it becomes thoroughly established and spreads rapidly.

Clovers (from Barteldes Seed Company).

Mammoth Sapling or Pea-vine Clover.—Being a rank grower, it is most valuable for fertilizing purposes. Foliage, flower, and stem are much darker than common red clover. It ripens later than the latter, about the time timothy, red-top, and other grasses ripen, making thereby a much better quality of hay when mixed with them. Sow 12 lb. to 15 lb. to the acre.

Japan Clover.—Low perennial; spreading habit. Stands excessive drought well. Flourishes on poorest soil in southern States of America. Sow 15 lb. per acre. It makes a fair hay, and stock eat it readily when green. It is also valuable for turning under as a green manure. Sow in spring, and broadcast at the rate of 30 lb. per acre.

Esparsette or German Clover.—A leguminous plant with many stems 2 ft. to 3 ft. long; leaves in pairs of oblong leaflets, hairy on under-side; flower-stalks higher than leaves, with spikes of crimson or variegated leaves followed by hard flat pods toothed and prickly. Perennial. Roots hard and woody. Same family as alfalfa. Adapted to light chalky soils; stands gravel and barren regions deficient in rainfall and without irrigation privileges. Shorter-lived plant than alfalfa, but will last from eight to ten years according to soil by judicious top-dressing of manure. It is excellent for cows, increasing flow and quality of milk. Would advise early and heavy seeding, followed with roller. Sow seed 2 in. deep and from 30 lb. to 40 lb. per acre.

BELFAST EXPERIMENTAL AREA.

SILVER-BEET VARIETY TEST, 1912-13.

A. MACPHERSON.

I HAVE to report that preparatory to being fed off by sheep the foliage from an area of the four varieties grown was cut and weighed on the 19th March, 1913, the following being the results:—

Plot.	Variety.	Date sown.	First Stripping: Yield.
	Montgomery and Co.'s—		Tons per Acre.
1	Perpetual spinach	16 11 12	34.30
2	Swiss chard or Silver Lucullus (curled)	16 11 12	42.80
3	Swiss chard or silver (plain), dark-green leaf	16 11 12	36.19
4	Swiss chard or silver (plain), pale-green leaf	12 11 12	25.52

The land on which the first three varieties were sown was in mangels last year, and that on which the fourth variety was sown was in Buda kale. Prior to sowing the seed each plot received a dressing of Belfast rape and mangel manure at the rate of 2 cwt. per acre.

VANCOUVER EGG-MARKET.

SPECIAL PROVISION FOR SHIPPING-SPACE BEING MADE.

THE Director of the Live-stock and Meat Division has received the following communication from the General Manager of the Union Steamship Company. It will be seen that the company has made special provision for the carriage of eggs under the most favourable conditions during next season.

We understand that there is every likelihood of shipments of eggs being offered for Vancouver next season, and that we shall be asked to provide space in cold storage. The difficulty hitherto has been that shipments have been offered in such small quantities that we had no chambers small enough to set aside for the purpose, and on account of the different temperature required the eggs could not be stowed in the same chamber with butter or meat. The cold-storage capacities of the Vancouver steamers will, however, be very much larger than was the case during the season just passed, and we are now endeavouring to make such arrangements as will afford convenience for shipments of eggs on at least some of the trips, if not every trip. We cannot say definitely what can be done until we gather some idea of the butter and meat space likely to be required in the coming season, but we are not likely to be able to gauge this with any reliability until the first week in September, but perhaps that will be soon enough to decide what can be done with regard to eggs.

PASTURES AND CROPS.

MARCH.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month :—

BAY OF ISLANDS.—The severe drought which has prevailed here since the middle of October still continues and is growing more serious to farmers every day. The oldest settlers assert that the present is the severest drought they have ever experienced, and numbers of large creeks have gone completely dry, a condition of things unknown before. It has had very disastrous effects upon all the lucerne experiments being carried out in this district. This is very disappointing, both from the settlers' and the Department's point of view, as they are the first trials of this splendid forage plant in the northern peninsula. The much-prized grass (*Paspalum dilatatum*) of the north has had a good opportunity to assert itself as a drought-resister. It is showing a splendid growth on the rich heavy soils of the Kaitaia district, and is a cheerful relief to the eye after viewing the parched areas of volcanic land in the Bay of Islands County. Fires were rampant during the month, and settlers had a very anxious time in fighting against the withering flames and saving their homesteads and fences from destruction. In many cases their efforts were in vain. Stock are now beginning to show the evil effects of the prolonged dryness, and the outlook for winter is very discouraging indeed. As a result prices at the live-stock sales are considerably lower than they have been for some time. Owing to the very low supply of cream, the local butter-factory proposes to cease operations at the end of the month, but farmers have not had large cheques this season to gladden their hearts.—*W. J. Dunlop.*

WHANGAREI.—The drought still continues, and many of the streams are beginning to run dry. Pastures are bare, and the only green vegetation to be seen is where *paspalum* is growing. The whole country is more or less fire-swept, and unless rain comes at once there will be a big mortality among stock. Most of the maize crop is a failure.—*A. P. Speedy.*

AUCKLAND.—The month opened with fine weather, followed by light showers at intervals; then warmer weather prevailed up till the 11th and 12th instant, when rain set in again. The moisture quite revived the pastures and gave an exceptional growth of grass all over the districts, green crops also benefiting by the rains. Then dry weather set in again and continued up to the 29th instant, when a change took place, followed by a constant downpour all day, which will do an immense amount of good to the pastures and forage crops, which were robbed of their green foliage by the drought. There is sufficient moisture now to nourish plant-life. I think there is nothing to fear, and there will be an abundance of feed to carry all descriptions of stock through the winter and the spring months. No doubt the dry spell of weather seriously affected the milk-supply for the city, and dairy factories as well; but stock did not suffer much, on account of the farmers having a plentiful supply of hay, maize, and other green food which were given them liberally, and kept them in the pink of condition, especially dairy cows. The bush settlers are the only ones who have not grumbled at the dry weather. They had large areas of felled bush waiting to be burnt off. I notice they, with few exceptions, got good burns. Now that the rains have set in there will be large areas ready for surface sowing at once. The turnip crops and autumn-sown potatoes are looking well.—*R. Rowan.*

OPOTIKI.—The weather during the early part of last month was very dry, but nice mild rain fell on the 11th and 12th. This was badly needed. Pastures are now looking well, and there will be plenty of feed throughout the district to commence the winter with. Early-sown maize is looking well, but that planted later has not done so well on account of the dry season.—*John Case.*

HAMILTON.—Beneficial rains on the 11th, 12th, and 28th of the past month had the effect of freshening up the pastures and promoting a good growth in the root crops, the turnip crops looking particularly well. This district has a remarkably good appearance for this time of year, and there is every prospect of a good supply of feed for the winter months. Dairy herds are in good order, and the milk-supply is greater than usual at this season. All classes of stock are in good condition, and prices are ruling high. In the back districts, with few exceptions, settlers have had excellent burns, and are busy sowing grass-seed and clovers.—*J. Kerr.*

TE AWAMUTU.—March was characterized by exceptional weather from a farmer's point of view. Twice during the month this district was blessed with splendid warm rains, ensuring abundance of grass for the autumn and a splendid root-crop for the winter. Crops have been harvested in good order, and stock are in splendid condition, with good markets.—*C. E. McPhee.*

KING COUNTRY.—The weather was most seasonable. Pastures, winter crops, and newly sown bush burns are in splendid order.—*B. Bayly.*

OHAKUNE.—From the 1st to the 16th exceptionally dry weather prevailed throughout the district. Rain fell on the 17th and 18th, and a cold snap was experienced until the 28th. Then warm winds sprang up, which were followed in due course by a heavy downpour on the 29th, since which date the condition has been variable, light showers alternating with periods of sunshine and frost at night. The spell of comparatively dry weather experienced up to the middle of last month did not appreciably affect pastures, and at present all classes of stock are amply provided for. Turnips, mangels, and carrots are looking remarkably well, and promise to prove a valuable asset to farmers during the winter months. Oats matured earlier this season than is usual for the district, and on the majority of farms where grown have been stacked in good condition. The amount of bushfelling on the different blocks and the successful burns thereon have materially enlarged the area of cleared ground within the district.—*P. Barry.*

GISBORNE.—There was a nice fall of rain about the 11th of the month, which gave the pastures a start. Further rain fell toward the end of the month, but not sufficient to do much good. The pastures throughout the district are parched in appearance and very scanty. Unless we have more rain soon, feed will be very short during the coming winter, more especially cattle-feed.—*W. Ross.*

NEW PLYMOUTH.—There were frequent light showers during the early part of the month, no heavy rain falling until the 28th. This lasted two days and caused the rivers to rise slightly. Although the nights have been cold the days have been very muggy and oppressive. The wet weather during the early part of the month caused considerable delay and damage to the late crops, and it is feared that there will be a considerable quantity of damaged grain and chaff. Threshing has begun. The yields so far are below the average. The root crops have made good growth, and maize has also done well this year. The pastures are exceptionally good, and there is abundance of feed in all parts of the district. The milk-yield is decreasing, as is to be expected at this season of the year; nevertheless cows are milking remarkably well. Within the last two months several of the factories have commenced to manufacture casein. All farmers are now very busy ploughing and getting in their winter crops, and burning and clearing weeds, the growth of which has been phenomenal. The increasing shortage of casual labour is keenly felt.—*R. E. Fairfax-Cholmeley.*

MANGAWEKA.—Fairly dry weather was experienced during March. Good heavy rain-showers fell on the 13th and 29th, which will do a lot of good to the country. The newly sown burns will benefit by this downfall. On the papa country old pastures still retain a greenness. There is still plenty of feed about, and some good crops of turnips are to be seen. Potato-digging is now general. The tubers vary a good deal as to size, but the table ones are better than they have been for some years. The weather for dipping favoured those who had plenty of water, but others again have not fared so well owing to creeks having dried up. Stock of all descriptions are doing well, and if the weather will only continue warm after this rain feed should be plentiful for starting the winter.—*J. A. Melrose.*

FEILDING.—The weather was dry during the past month. The pastures were not of a milk-producing nature, therefore the milk-yield was disappointing through feed not being succulent. Ensilage would have assisted in keeping up the milk-supply, and no doubt suppliers to factories will take notice when they read of distant friends reaping the benefit of feeding ensilage to stock during dry and off seasons of the year. We are getting warm rains now, which should send a plentiful supply of feed for the

autumn months. Peas are threshing out very good, while potatoes are turning out well in the Kiwitea and Kimbolton districts, and are very free from blight.—*William Dibble.*

WAIROA.—The weather during the month of March continued very dry, with the exception of a few refreshing showers that occurred at intervals throughout the month. There was no rainfall to promote growth to any extent, the consequent result being a great shortage of pastures throughout the district, thus causing the settlers anxiety with regard to making the necessary provision for the wintering of their stock. Stock are in good condition.—*T. F. Mullaly.*

HASTINGS.—The weather during March was of a pleasant description. Light rain fell on several days, and did much good, especially to turnip and rape crops, while pastures benefited to some extent. Much more rain is wanted. Self-sown grasses germinated freely after the rain, but are now suffering from drought and high winds.—*J. G. Parker.*

WAIKURAU.—Last month was a slight improvement on the previous one, there having been a good rain on the 11th, which promoted a fair growth in pastures, and will greatly assist the root crops, which were feeling the effect of the continued dry weather. Stock have got through the dry weather very well, and are in fair condition to face the coming winter.—*H. O. M. Christie.*

PAHIATUA.—Rainfall for the month was 4.91 in., rain falling on fifteen days, and the heaviest fall being 1.34 in., on the 11th instant. (Corresponding month of last year: Total fall 4.56 in. on thirteen days; heaviest fall 1.30 in., on the 15th.) The weather during the month was all that could be desired. We had a fair amount of warmth following the rain, and consequently there has been a fair growth both in roots and pastures. I sowed an experimental plot of lucerne on the 27th January; it made its appearance on the 1st February, and it is now 8 in. high. My plot of oats and vetches for winter use is now looking well. The birds were a great nuisance, causing the oats to come rather thin. Indications at the present time for winter feed are good.—*T. Bacon.*

NORTH WAIRARAPA.—The past month was favourable for farmers. The recent rains have had a tendency to freshen the pastures and bring away a nice growth. If favourable weather continues it should ensure winter feed. Harvesting is practically finished. Late-sown turnips have benefited by the recent rains. Stock also are looking well.—*J. S. Rankin.*

MASTERTON.—The country got very much dried up in the early part of the month, and the outlook was very serious. Warm rain set in on the 18th, continuing for several days, and we have had intermittent showers since, which have saved the situation. In some parts of the district it must have meant hundreds of pounds to the farmers. The ground had become very hard and dry, the grass was withering up fast, and the outlook for winter feed was very gloomy; now, however, a good supply of winter feed is assured. In some parts turnips and rape have done very well, potatoes promise a fair yield, and stock all look in very good condition. I notice pennyroyal is spreading rapidly in parts of the district.—*T. C. Webb.*

SOUTH WAIRARAPA.—The fine weather broke up on the 11th of last month, light showery weather following, which was required by dairy-farmers, as their herds had dropped considerably in their milk. At the present time the land is in exceptionally good order for breaking up for autumn cropping. Stock in general are looking well. Many turnip crops are affected with disease.—*S. C. Lyons.*

WELLINGTON.—March weather-conditions were very favourable to farmers and graziers. Grass is abundant—in parts of the district overgrown. Maize, mangels, and rape, together with all descriptions of stock, are looking very well. A notable feature of the month's climatic conditions was the prevalence of dense fogs over all the higher country.—*G. H. Jenkinson.*

BLENHEIM.—The greater part of the month was hot, dry, and windy. Rain fell after Easter, being followed by two nights' frost. Heavy rain came on again on the 28th, lasting for several hours, and the weather became very cold and wintry, but again changed to bright sunny weather. If there are no more frosts the prospects for winter feed will be assured.—*F. H. Brittain.*

SEDDON.—The weather for the month of March was very variable, consisting of some very warm and extremely cold days. Rain fell at intervals with some exception.

ally heavy winds, particularly at the latter end of the month, with cold showers and a slight fall of snow on the high country. Pastures all through the district are looking well. All chaffcutters and threshing-mills are working full time.—*E. T. Sinclair.*

NELSON.—The odd showers of rain and foggy weather during the month kept the pastures and root crops growing. The native grasses, where they were burnt off during the dry weather, are looking remarkably well. A large percentage of the turnips are young, but they are of good colour and are making good growth. The grain crops are all harvested and threshing-machines are at work. The frost that came about the 24th did some damage to the potatoes, but on the whole they are looking pretty well.—*Gilbert Ward.*

WESTLAND.—The weather last month was very wet and disagreeable, and at times exceptionally cold for the season of the year. The rainfall to date (28th) has been 5.47 in. It has rained on eighteen days, the maximum fall being on the 11th, when 1.05 in. was recorded. Snow fell on the ranges, and owing to the lateness of the season it is likely to remain throughout the winter, and early frosts may be expected in consequence. The weather experienced this summer has been very detrimental to the farmer, delaying agricultural pursuits generally, and is not at all encouraging for dealing with cultivation on an extensive scale. The majority of settlers seem to think that their attention is better directed by dealing with their land for grazing purposes.—*H. J. Walton.*

KAIKOURA.—With the exception of two days' nor'-wester winds, good weather prevailed throughout the month. Harvesting operations are completed, and returns satisfactory. Pastures and green crops are good and promise well for winter feed. Irish blight is prevalent among potatoes which have not been sprayed.—*W. S. Goodall.*

ROTHERHAM.—The weather for the month of March was exceptionally dry, the rainfall being the lowest for some years. We had a slight shower on the 11th instant—the only rain for the month. Pastures are drying up very fast, and unless a good rain comes soon the prospects for winter feed will not be too bright. We had a great deal of north-westerly weather during the month, and a terrific gale, on the 27th and 28th, which caused a big thaw in the back country, the rivers being all in very high flood on the 29th instant. Threshing is well on in this district, but the yields upon the whole are very disappointing. Prices offering for grain, potatoes, and fat stock are good, and farmers generally are in good spirits. Turnips and potatoes are fairly good and free from blight, but badly require rain. The rape crop this year was badly affected by the blight, consequently it did not stand much feeding.—*W. M. Munro.*

RANGIORA.—Early last month very heavy hailstorms did a large amount of damage to the Sheffield district. One farmer, at Waddington, calculates his loss at £600. Paddocks of grain were entirely stripped. The weather during the month was fairly fine and allowed nearly all the grain to be harvested and threshed. The results have not been as good as was expected. There was a great rainfall on the hills, but very little on the plains. These rains caused the Waimakariri to overflow at Bealey and also at Belfast, but I have not heard that it did very much damage. Rainfall for month, 0.5 in.; sunshine, 156 hours 5 minutes. Winds, easterly and westerly alternating.—*A. Hughes.*

LINCOLN.—During March a dry spell of weather was experienced. This, whilst it enabled good progress to be made with the threshing of cereals and the harvesting of clovers, was unfavourable to the growth of green crops and pastures. A good rain would now be very welcome. In some localities blight has appeared in the potato crops. Late crops also have been injured by frost. On some farms skim-ploughing of stubbles has been pushed ahead. Leas, however, are at present rather hard for ploughing.—*J. G. Scott.*

FAIRLIE.—A good deal of wet weather was experienced during the month. Root crops and pastures have done well. Potatoes are being dug, and the crop is a very poor one. Large numbers of fat lambs are now going down to the works. High prices are being realized, one mob being sold in the yards at £1 0s. 2d. Ewes are also very dear, two-tooth half-breds bringing up to £1 5s.—*W. B. Manning.*

TIMARU.—During March the weather was very unsettled, with high winds from the north-west and south-west, accompanied by constant showers and heavy rain; there were also a few frosts. Potato-blight has shown up in a few places. The pastures have a good growth of grass, and there should be good winter feed.—*J. C. Huddleston.*

WAIMATE.—The month of March was unusually wet, and threshing operations have been somewhat hindered. Generally speaking, grain has been safely stacked, and fair yields are expected, although it is thought the average yields will be much below those of last year. The weather from a grazing point of view has been suitable. Pastures are good, and there is an abundance of feed, and there are now good prospects of an ample supply of feed to carry stock over the winter months. Turnips, rape, and mangels have done fairly well. Potatoes, although some fair crops can be noticed, are in many cases blighted, but fair returns may be hoped for. Threshing is now in full swing, but finer weather would greatly facilitate the work.—*F. A. Macdonald.*

KUROW.—We had a fair share of showery weather during the past month, which will ensure a good growth of autumn feed, providing we have no hard frosts to retard growth. Stock of all kinds, both on the high country and lowlands, are in splendid condition and in good heart to face the approaching winter. The Waitaki River is in high flood just now, and old residents state that it has not been so high for over twenty years.—*G. Reid.*

OAMARU.—This month was most unsettled throughout. North-east rains and southerly winds and rain were prevalent throughout the month, with short periods of warm fine weather between. The pastures have improved considerably on account of moisture. The harvest is practically over, and yields are averaging about 35 bushels in most cases. The potato crop is not reaching expectations and is digging light. Rain, fall, 2.28 in.—*W. F. Flower.*

PALMERSTON SOUTH.—A good deal of fog and drizzling rain during the first part of the month, and heavier rains during the latter. Rain fell on seventeen days, the total being 1.60 in. Pastures freshened up greatly, and there is now a good supply of rough feed. Root crops made excellent progress during the last six weeks. Threshing is now in full swing.—*C. S. Dalgliesh.*

DUNEDIN.—The weather during March was stormy, cold, and wet—in fact very bad harvest weather, as there was some rain practically every second day. This had a bad effect on turnips, mangels, and potatoes, as there was no genial sunshine to make up for late sowing. Pastures are fairly good, as they usually require a lot of moisture, and most farms not being heavily stocked during summer, there will be a good deal of rough paddock feed for the winter months. This district has escaped the disastrous floods which did so much damage elsewhere.—*J. R. Renton.*

MOSGIEL.—During the month of March the weather was unfavourable for threshing and stacking. Rain fell on the 10th, 12th, 13th, and 14th, the heaviest fall being on the 27th and 28th, but no damage was done to crops or stock. Throughout the district pastures are looking well, as well as early turnips and mangels. Threshing is in full swing. The average yield will not be as good as last season. Half the potato plots growing at Milton District High School were sprayed with Bordeaux mixture on the 11th February by Mr. W. T. Goodwin, Orchard Instructor, and are quite green in the leaf and healthy, while the half left unsprayed are blighted very badly. Any one interested in growing potatoes should inspect the plots and see the result.—*H. McLeod.*

STRATH TAIERI.—The weather during the greater part of the month was rather cold and dry, with several days of high wind. A heavy rainfall took place on the 28th (2.36 in.), which will greatly benefit pastures and green crops. Cereal crops were saved in good condition, and where threshing has been carried out the returns are satisfactory. Turnip crops are lighter than usual, and blight is noticeable among swedes.—*W. Scott.*

MANIOTOTO.—Good growing-weather during whole of month. Turnips came away very well; plenty of grass, and on high country good rough feed. Stock looking well.—*A. T. N. Simpson.*

CLYDE.—The weather for March was very dry right up to the end of the month, when on the 27th and 28th we experienced very heavy rain. The rainfall for the month was 3.10 in. All rivers in the district rose a considerable height above normal. The majority of farmers have their crops threshed and carted away, and are preparing for next season's crops.—*Thomas N. Baxter.*

LAWRENCE.—The weather for the month was variable. A good deal of the crop has been cut and stacked. Towards the end of the month a very heavy rainfall was experienced, with floods upon low-lying country, which had a disastrous effect upon stock and standing crops, &c.—*B. Barron.*

OWAKA.—March was a most changeable month. There was not much rain, but showers were frequent, and this has retarded harvesting operations. There are some very fine crops of oats and turnips in the district, and rape is also looking well. Most of the potato crops are blighted and the yields will not come up to expectations. Pastures are satisfactory, and there is plenty of feed everywhere.—*R. McGillivray.*

TAPANUI.—During the early part of the month the weather was fair, enabling much of the grain to be stacked, and mills are now busy. Some of the best oat crops are yielding from 50 to 60 bushels, but the majority are very light. Wheat in most cases looks well. Turnips are still growing well, especially swedes, and no blight is noticeable. Blight on the potato crop is almost unknown in this district, but a very heavy frost on the morning of the 24th blackened the tops everywhere. It is not thought that much harm will result from this, as the tubers are well advanced. Extremely heavy rain started here on the evening of the 27th and continued steadily for over twenty-four hours, rivers and creeks being in high flood at time of writing.—*W. J. McCulloch.*

GORE.—During the greater part of the past month the weather was favourable, and farmers made good progress with the harvest. Pastures are holding out well, and turnips are looking splendid. On the evening of the 27th exceptionally heavy rain set in and continued for thirty hours without intermission, and in the early hours of Saturday morning came down one of the most disastrous floods in the history of this district. At present the damage to crops and other property can hardly be estimated. Paddocks of grain have disappeared, and also fences in some localities.—*B. Grant.*

LÜMSDEN.—The weather for the month of March was very changeable. The first week was very wet, but was followed by some warm sunny days, and farmers were to be seen making the most of the fine weather, cutting and harvesting the crops. Towards the middle of the month we experienced several sharp frosts, which cut down a good number of the potato crops. On the 27th very heavy rain fell, causing the river to overflow, doing a tremendous amount of damage, the old settlers considering it the biggest flood known for the last thirty years. In most cases threshing returns are very light. Pastures were looking well until this recent flood. Turnip crops are very good.—*W. S. S. Cantrell.*

INVERCARGILL.—The country throughout this district begins to have a wintry appearance, grass paddocks are bare, and on some places turnips and rape are being eaten off. Harvest is dragging slowly on, owing to the unsettled state of the weather. Grain crops generally are light, but turnips and potatoes promise well. We have had a few sunny days this month, with a sharp frost on the night of the 23rd instant, the grass on the following morning being quite stiff and white. The rainfall was 7.34 in., which is very high for this season of the year, 2.69 in. having fallen in twenty-four hours on the 27th and 28th of the month, and the fall was much heavier inland, the result being that the biggest floods ever known to the oldest inhabitants of Southland were experienced on Saturday and Sunday last. Farmers on low-lying lands have suffered very severe losses, and railway traffic has been completely disorganized.—*J. R. Whyborn.*

OTAUTAU.—The weather for the month was anything but favourable for the farmers, harvesting being prolonged through constant wet weather. Some threshing is done, but results are poor compared with previous years. Rain commenced last night and continued throughout the whole night, the result being the heaviest flood ever known. So far I have not been able to ascertain the extent of the damage, but from what can be seen near at hand many thousands of pounds will be required to cover the loss.—*H. F. Dencker.*

QUEENSTOWN.—During the month the weather was very broken, and although a considerable number of wet days were experienced no great amount of rain fell until the 27th and 28th, when we had about twenty-six hours, swelling the rivers and lake, but no damage therefrom is so far reported in this district. We had frosts on the mornings of the 17th and 31st.—*A. Clarke.*

PEMBROKE.—The weather during the month was changeable, and at times very cold and stormy. The rainfall was exceptionally heavy and all rivers are in flood. Pastures, crops, &c., have come away well, the growth being very noticeable throughout the district.—*J. A. Griffith.*

Moisture in the soil is like money in the bank.

THE FRUIT CROP.

THE Officers of the Orchards, Gardens, and Apiaries Division report as follows on the condition of the fruit crop at the end of March :—

WHANGAREI.—Apples, medium crop. Lemons looking well. Pears heavy; main crop finished. Tomatoes nearly finished; no sign of blight. Oranges, promise of an average crop.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, good crop. Lemons, crop looking well. Peaches nearly over. Pears, good crop. Plums practically finished. Tomatoes, crop finished.—*W. C. Thompson.*

AUCKLAND SOUTH.—Apples, only late varieties left; fair crop. Pears almost done. Nectarines, crop finished. Peaches, crop finished. Tomatoes, still good picking; free from blight.—*N. R. Pierce.*

HAMILTON.—Apples still in fair supply; prices for good grades higher than usual. Lemons very scarce; young fruit developing well. Nectarines all harvested. Peaches getting scarce. Pears, late crops still to harvest; prices are very firm. Plums (English), practically all harvested. Plums (Japanese), all harvested; have realized higher prices than usual. Tomatoes, fair crop; these are of extra-good quality and free from disease. Walnuts, light crop.—*T. E. Rodda.*

POVERTY BAY.—Apples, crop below average; dry summer is bringing late varieties to maturity long before their usual season, and large quantities rendered unmarketable owing to the ravages of codlin-moth where spraying neglected. Lemons, poor crop. Peaches, late crops good, now almost over. Pears, good crop; same remarks as to apples. Tomatoes, good crop. Walnuts, good average crop; an extra heavy crop would have been harvested but for the severe attack of bacteriosis.—*W. R. Williams.*

MANAWATU AND WAIRARAPA.—Apples, medium crop; late varieties better than anticipated. Pears, fairly good crop; fetching good prices in market; some varieties attacked with black-spot. Tomatoes, average crop; very cheap lately; glut in market; very little disease.—*George Stratford.*

HASTINGS.—Apples, moderately good crop. Lemons, very little grown in district. Nectarines, season over. Peaches, season almost over; crops very heavy, size small; average prices satisfactory; rust troublesome. Pears, heavy crops good quality; damaged by scab in early season. Plums, season over. Tomatoes, good average crop. Walnuts, good crop.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop. Pears, average to heavy crop. Plums, crop finished. Tomatoes, average crop.—*T. C. Webb.*

NELSON.—Apples, good crop; crops picking as well as anticipated. Peaches, crop almost finished with the exception of a few going into canning-works and market. Pears, fair crop being picked. Plums, crop nearly finished; a few cases of late red being sent away. Strawberries, second crop very poor. Tomatoes, mostly factory fruit now being gathered.—*J. H. Thorp.*

BLenheim.—Apples, medium crop; looking very well, especially Jonathan, which are very highly coloured. Apricots, very light crop; late frost in November cut nearly all fruit off. Cherries, fair to medium; harvest completed. Lemons, good crop. Nectarines, light. Peaches, very light, owing to late frost; all picked except a few late varieties. Pears, fair average crop; some varieties badly damaged by scab. Plums (English), heavy crop, which is almost over. Plums (Japanese), medium crop. Tomatoes, good crop, ripening and growing well. Walnuts, heavy crop; just commencing to gather a few.—*B. G. Goodwin.*

CHRISTCHURCH.—Apples, good crop; a few varieties slightly affected with black-spot. Peaches, practically over. Pears, good crop; some damaged with pear-scab. Plums, crop almost over. Tomatoes, good crop, still picking freely. Walnuts, light crop.—*W. J. Courtier.*

TIMARU.—Apples, main crop coming to hand; the supplies are short of the demand, and consequently prices are good. Pears, supplies coming forward; these are rather scabby, but not bad enough to warrant condemning. Tomatoes, heavy supplies, low prices ruling in consequence. Walnuts, good crop; crop doing exceptionally well.—*A. B. Mansfield.*

DUNEDIN.—Apples, good crop. Pears, good crop. Tomatoes, good crop. Walnuts, fair crop.—*W. T. Goodchain.*

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of March:—

AUCKLAND.—Throughout the month of March large quantities of locally grown fruit have been handled and examined, and I am pleased to report that, with the exception of a line of six cases of pears which arrived from Whangarei badly affected with scab and were destroyed, the fruit was clean, and no warning notices were issued. The markets have been heavily supplied with all seasonable fruits, particularly apples and pears; but, as the demand for fruit has been keen, the prices are good. Occasional lots of Northern Spy are coming to hand, and these are of very good size, colour, and quality, and show a good return to the grower at from 8s. to 9s. 6d. per case. The average prices ruling throughout the month for fruit are as follows: Apples—choice dessert, 5s. to 9s. 6d. per case; second class, 3s. to 5s. per case. Pears—choice dessert, 5s. to 9s. 6d. per case; second class, 3s. 9d. to 6s. per case. Quinces, 3s. 6d. to 4s. 9d. per case. Grapes—hothouse, 9d. to 1s. 3d. per pound; outdoor, 3s. to 5s. per 18 lb. case. Lemons—choice, 9s. to 14s. per case; second class, 5s. to 8s. per case. Figs, 2s. to 4s. per 18 lb. case. Water-melons (local), 9d. to 1s. 3d. each. Tomatoes—very unsteady, fluctuating from 1s. 6d. to 5s. per 18 lb. case.—*C. Craigie.*

WELLINGTON.—Supplies of practically all lines of local fruit dropped in price during the beginning of this month, but are now improving. The markets were glutted in the earlier part of the month with tomatoes, and low prices prevailed, some lines selling at 6d. per case. Later, however, the market has improved considerably and higher prices realized. Apples and pears are now arriving in good order, nicely packed and graded. The approximate prices ruling for fruit during the month are as follows: Apples—choice, 5s. 6d. to 8s. 6d. per case; cooking, 4s. to 5s. 6d. per case. Pears—choice, 5s. to 8s. 6d. per case; cooking, 2s. to 3s. 6d. per case. Plums (small supply), 2s. 6d. to 3s. 6d. per half-case. Peaches—choice, 3s. to 3s. 6d. per case; others, 2s. per case. Grapes—Lower Hutt, 7d. to 11d. per pound; Nelson, 5d. to 10d. per pound. Cape gooseberries, 4d. to 5d. per pound. Blackberries, 5s. to 6s. per kerosene-tin. Quinces, 1s. 6d. to 3s. per case. Tomatoes—choice, 2s. to 3s. per case; medium, 1s. to 1s. 6d. per case. Cucumbers—hothouse, 2s. to 3s. per case; outdoor, 5s. to 6s. per banana-case. Potatoes have eased slightly, due to South Island supplies, which are arriving in fair condition, and realizing £6 to £7 10s. per ton. Onions are in fair supply and the quality is good; prices have eased somewhat, fetching from £6 to £7 per ton. All other vegetables are in good supply, and the prices vary very little from last month's quotations.—*T. C. Webb.*

CHRISTCHURCH.—Fruit and vegetables are in fair supply, the ruling prices being as follows: Apples—dessert, 4s. 6d. to 5s. per case; cooking, 3s. 6d. to 4s. per case. Bananas—Cook Islands, 8s. to 9s. per case; Fiji, 9s. to 10s. per case. Lemons—Italian, £1 2s. 6d. per case. Grapes—Australian, 4d. per pound; local, 6d. to 10d. per pound. Peaches, 1d. to 2d. per pound. Pears, ½d. to 2d. per pound. Potatoes, 6s. to 7s. per cwt. Cucumbers, 2s. to 3s. per case. Tomatoes, ¾d. to 1½d. per pound. Other vegetables in fair supply.—*E. A. Reid.*

DUNEDIN.—During the month peaches, plums, and tomatoes have been in poor supply, grapes, apples, and pears have been plentiful, while apricots are now finished. Cauliflowers, cabbage, lettuce, rhubarb, carrots, beetroot, and potatoes have been plentiful. All lines of fruit and vegetables were in good order, and the ruling prices for the month are as follows: Tomatoes—outside, 2½d. to 3½d. per pound; hothouse, 5d. per pound. Plums, 2d. per pound. Pears, 5s. to 6s. per case. Apples, 6s. to 7s. per case. Apricots, 4d. per pound. Blackberries, 6½d. per pound. Peaches, 4d. per pound. Potatoes, 6s. 4d. per cwt. Peas, 1½d. per pound. Cabbage, 2s. 6d. per sack. Shops well stocked.—*E. T. Taylor.*

BLUFF.—A large amount of New Zealand fruit was on this market during March. However, as the demand for fruit was keen the market was not glutted, except perhaps for a few days in the case of tomatoes. The local markets are stocked with fruit from Auckland, Hawke's Bay, Nelson, Canterbury, North Otago, Teviot, and Southland, and owing to the local supply importations have eased. The majority of the fruit is very well packed and graded and in a clean condition. Warning notices were issued to Canterbury growers for scab on apples and pears. The following is a list of the average prices ruling during the month: Tomatoes—hothouse, 3d. to 5d. per pound; outdoor, 1d. to 4d. per pound. Peaches, 2½d. to 4½d. per pound. Plums, 2d. to 4d. per pound. Pears, 2s. 6d. to 8s. per case. Apples—dessert, 6s. to 8s. per case; cooking, 2s. 6d. to 6s. per case. Grapes, 8d. to 1s. 3d. per pound. Quinces, 5s. per case. Onions, 8s. to 9s. per cwt. Potatoes, £5 to £6 per ton. Cabbages, 1s. per dozen. Cauliflowers, 2s. to 3s. per dozen. Parsnips, carrots, and turnips, 1s. per bunch of a dozen. Cucumbers—hothouse, 2s. 6d. to 3s. per dozen; outdoor, 1s. per dozen. Rhubarb, 1d. to 1½d. Marrows and pumpkins, 10s. per cwt.—*R. Hutton.*

HONEY - CROP PROSPECTS.

THE Director of Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—Owing to dry summer, honey-flow ceased early in March, but good yields were secured. The market price averaged 10s. per dozen 2½lb. tins.—*G. V. Westbrooke.*

WELLINGTON.—Honey crop in my district now almost completely gathered, the greater quantity of which was of excellent quality. Prices are firm, and beekeepers in Taranaki and elsewhere are arranging for export shipments, which are expected to assist the local trade.—*F. A. Jacobsen.*

CHRISTCHURCH.—Honey season is now finished, and most beekeepers are preparing for the winter. A fair trade doing, and prices much the same as last month, although there is a tendency to advance.—*L. Bowman.*

DUNEDIN.—The surplus of honey is in excess of last season's crop. Extracting has finished. Bulk honey sent forward is meeting good demand, bringing from 4d. to 4½d. per pound; in 1½lb. glass bottles, 9s. per dozen. Fancy white-comb honey realizes 7s. per dozen. Beekeepers are warned against forwarding lots in second-hand packages (kerosene-tins). Dunedin auctioneers complain bitterly of methods adopted, and consequently by which prices are affected.—*E. A. Earp.*

HONEY ON A LONDON ROOF.—It will surprise many to learn that an apiary is being maintained with profit in the very heart of busy London. Within sight of Holborn, on the roof of a block of flats, Mr. Wakevell keeps fifteen hives, from one of which last year he obtained 53½lb. of honey. The bees buzz as merrily in the London smoke as if they were in a country garden. They find their own food in the summer, but during the winter sugar-canes are placed on the roof for them.

THE WEATHER.

DISTRICT NOTES DURING MARCH.

D. C. BATES.

Chiefly from Telegraphic Reports.

District.

1. The weather was generally fine and warm, with bright sunshine in excess of the average and rainfall below, especially in the northernmost portion, where the percentage below ranged from 60 to 80 per cent. In the southern half the total fall was about 20 per cent. less than the average.
- 2, 4, 9. The departure from the normal rainfall varied greatly in these districts—viz., from slightly below to 50 per cent. in excess; but generally the difference was a positive one. Fair weather predominated, but cloudy and misty conditions were frequent. Heavy rain fell on the 12th, and in parts on the 28th and 29th, but usually precipitation was in the nature of showers.
- 3, 5, 6. About 28 per cent. below the usual March rainfall. Moderate and variable breezes prevailed, with fine weather generally.
- 7, 8. Warm and dry weather was experienced, the rainfall being less than the average by from 60 to as much as 100 per cent.
10. In the northern half of this district precipitation exceeded the average slightly, but in the south about 20 per cent. less than the average amount was recorded. During the first week fine and clear weather prevailed, but from then to the end of the month dull conditions were much in evidence, and temperatures were appreciably lower towards the close of the month. On the 28th and 29th high northerly winds were experienced.
- 11, 12. About the average and slightly less than the average rain fell in these districts. No very heavy falls occurred, but showers were frequent. Very squally conditions were experienced on the 17th and 28th, with northerly winds, but the directions were very variable during the month and much dull and misty weather prevailed.
13. In the beginning and end of the month much rain fell, and the total fall was usually double the average. With the exception of the 16th and 17th, fair weather prevailed between the 9th and 20th, but unsettled and wet conditions ruled during the remainder of the month. Some dense fog occurred on the 12th and 13th.
14. With the exception of a few unsettled and wet days in the middle and at the end of the month weather-conditions were very favourable. Forty-five per cent. below the average rainfall was recorded.
- 15, 16. Particularly heavy rain fell in all the high country, especially on the western slopes, where over double the average amount was recorded for the month. Following are some of the high-level stations with their total rainfall recorded during the four days from the 26th to the 29th: Otira, 17.17 in.; Bealey, 6.52 in.; Bealey Flat, 18.44 in.; Hermitage, 21.93 in. During this period many of the larger rivers became flooded.
17. Owing to the heavy rains between the 26th and 29th, the total for the month greatly exceeded the average, in some cases by over 100 per cent. The weather was very changeable; showers were frequent, especially on the higher levels. Some cold nights were experienced, and the first frosts on the 23rd.
- 18-22. In all these districts the rainfall was below the average, the difference ranging from about 20 to 80 per cent. Continuous fine weather prevailed between the 1st and 10th, and other shorter periods of similar conditions were experienced during the month. Strong winds, however, were frequent.



District.

23. Much showery weather prevailed between the 9th and 17th, and again towards the end of the month, but fair though cold conditions predominated. Precipitation was about 30 per cent. in excess of the average for March.
- 24, 25. With the exception of a few short periods of fair weather, conditions were generally cold and damp, the rainfall being considerably above the average.

SUMMARY.

Except for a depression which existed off East Cape between the 23rd and 26th, the atmospheric disturbances have been of the westerly low-pressure type, passing to the southward of New Zealand. Of these the most notable one was that which influenced weather-conditions between the 26th and 30th. During this period extremely heavy rains occurred in the high levels of the South Island and in Otago, causing floods in many of the larger rivers. Of the rainfalls at this time it may be interesting to specially note that experienced at the Hermitage. On four days 21.93 in. fell, and of this amount 19.10 in. fell on two days—viz., on the 27th and 28th. It may be easily understood what a marked effect on the river-level such an abnormal fall over a wide area would have. While Otago and the central portion of the South Island had an excessive rainfall, in some cases double the average, the east and west coast of the South Island had less than the average. In the North Island the Taranaki and Wanganui districts experienced more than the average, but in the northern and east coast districts nothing more than a few occasional showers were experienced, and the total was considerably below the average for March. In these districts, and also in the east coast of the South Island as far as Timaru, fair and dry conditions ruled, but elsewhere much dull and misty weather prevailed during the month. High northerly winds occurred in and southward of Cook Strait on frequent occasions, particularly on the 17th, 28th, and 29th. The first frosts of the season were reported in the south on the 23rd.

STOCK EXPORTED.

MARCH, 1913.

THE following table shows the numbers and descriptions of stock exported from the Dominion:—

Port of Shipment.	Horses.			Cattle.			Sheep.		Swine	
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To Argentine.	To Australia.	To Pacific Islands.	To South America.	To Pacific Islands.
Auckland	33	7	..	..	13	..	..	224	..	29
Gisborne	4	..	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	..	..	..	..	..
Wellington	39	..	..	7	..	..	..	..	..	..
Lyttelton	33	..	..	1	..	..	93	..	..	..
Timaru	..	..	..	..	..	..	274	..	..	..
Dunedin	18	..	..	..	..	..	63	..	..	..
Bluff	7	..	..	..	..	..	..	..	..	..
Totals	134	7	..	8	13	..	430	224	..	29

The following are the particulars of the horses shipped: Thoroughbred—1 stallion, 25 mares, 9 geldings, 4 colts, 4 fillies; ponies—2 mares, 2 geldings; hacks—4 stallions, 9 mares, 25 geldings; draught—19 stallions, 15 mares, 1 gelding, 9 colts, 7 fillies; 1 half-draught mare, 1 gelding, 1 half-thoroughbred mare, 1 gelding cob, 1 Welsh stallion.

ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the *Journal*, in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question the most complete descriptive details should be furnished.

ERADICATION OF CALIFORNIAN THISTLE.

MR. C. MCGUINNESS, Mangatoki, writes as follows :—

Will you kindly let me know through your correspondence column whether any experiments have been made to kill Californian thistle with common coal-tar by the Agricultural Department? I have noticed that wherever tar has been spilt all herbage dies, and am of opinion that if a coat of tar was put over the thistle, with holes driven here and there with a bar and filled with tar, it might have the desired effect.

The Fields and Experimental Farms Division replies,—

While it is well recognized that the application of coal-tar has the effect of destroying weeds, it has to be remembered that it would be impracticable of application on an extensive area.

FERTILIZERS.

MR. W. B. FITCHETT, "Tiritiri," Kawhia, writes,—

Can you inform me whether the following manures may be safely mixed together without any harmful results: (1) Basic superphosphate and kainit; (2) basic superphosphate and nitrate of soda; (3) basic slag and kainit?

The Agricultural Chemist replies,—

These may be mixed if sown immediately after mixing.

PHALARIS BULBOSA.

"SUBSCRIBER," Riverlea, Taranaki, writes,—

Would the Department answer through the *Journal* the following :—

1. Would *Phalaris bulbosa* be a good grass to introduce in a patch of raupo swamp that is gradually drying up?
2. Do cattle eat it readily, or would it become coarse like tall fescue and become a nuisance; if so, would it be difficult to eradicate?

The Fields and Experimental Farms Division replies,—

Phalaris bulbosa is spreading in many swamps. It is readily eaten by cattle. It may not be a particularly valuable grass, but gives more winter feed than many of the other grasses. If sown with cocksfoot and rye-grass much more feed would probably be obtained. It is of a different character to tall fescue, and would not be likely to become a nuisance.

CLOVERS.

MR. G. A. READE, Pukerangi, Central Otago, writes,—

I forward under separate cover two forage plants of the trefoil family, which I have found growing together in masses on sunny banks at an Otago seaside resort, and it occurs to me they might be useful for surface-sowing on sheep-country in Central Otago

occupied by me. One of the specimens (the larger-leaved) produces a small spiral burr, which I feel would be sure to adhere to the sheep's wool, and it would therefore probably be inadvisable to introduce the plant on sheep-country. I shall feel obliged if you will kindly in the *Journal* give me the names of the two plants, and any information at your disposal as to the full value of each variety: also whether you agree with me as to the risk of introducing the burr-producing plant among sheep.

The Fields and Experimental Farms Division replies,—

The names of the specimen clovers sent by you are—No. 1, Spotted burr clover (*Medicago maculata*). An account of this clover will be found in the May, 1911, number of the *Journal*. No. 2, English clover (*Medicago lupulina*). This is an annual or biennial clover that is often sown on sheep-country. It is decidedly useful on light soils, especially those of a sandy nature. It is common throughout Hawke's Bay, though not regarded as of very much value, but it certainly yields a good deal of highly nutritious fodder.

BRANDING SHEEP.

C. E. B., Nelson, writes,—

Would you oblige by letting me know through your paper (1) if oxide paint is harmful to the wool if used for branding sheep, and (2) if hematite used for same is harmful.

The Live-stock and Meat Division replies,—

Although neither oxide paint nor hematite is regarded as harmful to the wool, both are very difficult to remove, and are therefore objectionable; consequently one of the several recognized branding-fluids is recommended.

VETERINARY SCIENCE.

MR. G. C. NEVILLE, Opotiki writes,—

I should be very much obliged if you could tell me if there is a course one can take in veterinary surgery so as to qualify as a veterinary surgeon, and where could one take this course, and what length would it be, and how much would it cost.

The Live-stock and Meat Division replies,—

The nearest colleges where such a course could be taken are in Australia—Sydney and Melbourne—where they are in connection with the Universities. We have only the Melbourne prospectus. There are two courses open to students—one, of four years and a half, leading to the degree of Bachelor of Veterinary Science and ultimately Doctor; the other, of four years, leading to the License in Veterinary Science. The candidate for the degree is required to pass a preliminary examination similar to that required for the medical profession and for all the veterinary schools in the United Kingdom—viz., Latin, English, arithmetic, algebra, geometry, and one of the following optional subjects: Greek, French, or German. A candidate for the licentiate is required to pass a preliminary examination of a lower standard in those subjects which are indispensable for an understanding of the work of the course—viz., English, arithmetic, algebra, and geometry, and two other optional subjects. Examinations are held each year, and the student must pass these before he undertakes further work. If he fails he must come up again. We do not know exactly when the examinations are held, probably twice a year, as in the English schools. This means, should a student fail, say, in his first professional examination, he would have to study for another half-year before presenting himself again. The fees payable for the courses are as follows: Bachelor of Veterinary Science—For matriculation, £1 1s.; for first year, £22; for second year, £25; for third year, £25; for fourth year, £25; for fifth year, £20 3 for license and degree, £7 7s. License in Veterinary Science—For the first year, £18; for the second year, £25; for the third year, £25; for the fourth year, £25; for the license, £5 5s. To these fees must be added cost of books, microscope, instruments, and living-expenses. The Sydney course is practically the same as that of Melbourne.

MISCELLANEOUS QUERIES.

MR. J. E. LUCKENS, Lawson's Creek, Auckland Harbour, writes as follows:—

1. Where can I get the spineless cactus which Luther Burbank has evolved from the prickly pear and which produced 200 tons of fodder per acre?

2. Which is the right name for "Boyd's clover"—*Lotus hispidus* or *L. angustissimus*? Neighbours praise it highly; but I think *Lotus major* the best for this poor gum land.

3. Has sea-water any wholesale manurial properties? I watered some plants with it, but it killed them finally.

4. What is the best kind of goat to keep for milk; and do you think a goat dairy would pay, as some of my land is too rough for cows?

5. What would you recommend as food for milch-goats?

6. Which is the best butter-fat cow? Jersey, I believe; but, judging by some Holstein records, the latter is as good, and has the advantage of being a beef cow as well. I suppose Jerseys would eat less fodder, though?

The Fields and Experimental Farms Division replies,—

1. I would refer you to Luther Burbank himself, whose address is Los Angeles, California.

2. *Lotus angustissimus* is the correct name for Boyd's clover. This clover and *Lotus hispidus*, which is a closely allied species, are being very highly praised; but in localities where *Lotus major* thrives well the last-named is probably preferable to sow. *Lotus major* seed is, however, considerably dearer than *Lotus angustissimus*, and there seems no reason to think that the price will ever be low enough to sow it in any great quantity in a mixture.

The Agricultural Chemist replies,—

3. It is not advisable to water any crops with sea-water. Salt drilled in with the manure may prove useful for some crops, such as turnips, kale, rape, mangels, sugar-beet (grown for stock-food), asparagus, and plants whose ancestors inhabited marine or salty situations.

The Live-stock and Meat Division replies,—

4. Probably the best milch-goat of the British breeds is the English one, which has had a society for the improvement of the breed since 1879. The Scottish Lowlands goat is perhaps the next-best milker. Welsh and Irish goats are poor milkers, and are only in profit for a short period. The two best milking breeds are foreign, and both have been crossed with the English goat, greatly to the improvement of the latter. The one first imported was the Nubian. Pure specimens, however, cannot be obtained now. The other and much the best is the Swiss breed called the Toggenburg. It is rather a tall goat, measuring about 30 in. high at the shoulder. Neither sex has horns. The udder is well developed, with the teats far enough apart. It is stated that as much as 158 gallons in a season of over three hundred days has been obtained from them. I do not think there are any of the breed in this country, and they could not be imported from Switzerland owing to our regulations prohibiting live-stock from Continental countries. Specimens, however, could be obtained from Great Britain. We could not advise you as to whether a goat dairy would pay. It would depend on the demand you got for the milk. You would hardly make a success of it with the goats here, without crossing, as they would not give enough milk to be profitable.

5. Goats are browsing animals mainly, but will practically eat anything—all sorts of vegetables, potatoes, carrots, &c. A Swiss authority considers that in summer a goat will consume on an average 3 lb. of hay, 3 lb. of clover, and 10 lb. of green food per diem; and, in the winter, 6 lb. of roots, 2 lb. of hay, 3 lb. of clover, and $\frac{1}{2}$ lb. to 1 lb. of crushed oats. The crushed oats may also be given during the time the animal is in milk.

The Dairy-produce Division replies,—

6. It may be said that there is no "best" breed of dairy cattle amongst the various breeds of that class of stock, for there are unprofitable as well as profitable cows amongst all breeds of dairy cattle. As a breed the Jerseys are noted for a

high percentage of butter-fat in their milk, but it does not follow that these cows give a higher aggregate quantity of fat in a given period than other well-known breeds, and, after all, it is a total quantity given that counts. There are first-class cows among all breeds, including Jerseys, Guernseys, Holsteins, Ayrshires, &c., and the only true test of value is to produce a record of the quantity of both milk and butter-fat given by a cow for her whole period of lactation, by weighing and testing the milk. In choosing a special breed of dairy cattle the class of land to be used has to be taken into consideration. For instance, it would be unwise to select one of the heavier breeds, such as the Holstein, for lightish land or that which is too hilly. On such country one of the lighter breeds would be more serviceable. Then again, a farmer when making his selection is wise in being guided to some extent by the class of cattle in which he may have a special interest. Heavy animals, of course, usually require more food to maintain their bodies than do those of lighter breed, but just what that amount may be is not definitely known, so far as we are aware. A Jersey cow giving 6,000 lb. of milk testing 5 per cent. in a season would produce 300 lb. of fat, while a Holstein giving 8,600 lb. of milk testing 3.5 per cent. would do equally well and produce 301 lb. in a season. When considering the extra food required by the larger cow, however, allowance should be made for the value of the extra quantity of by-product that would be available from her milk.

CLOVER-HAY.

MR. J. W. BOWE, Marotiri, Wellington, writes,—

I have a crop of cow grass and alsike clover which I cut for hay about two months ago and which is almost ready to cut again. Please let me know whether you think it would be advisable to cut it again, or do you think it would impoverish the land too much? The soil is a good, deep, clayey loam, which has only been broken up about eighteen months.

The Fields and Experimental Farms Division replies,—

On fertile lands it is not unusual to take two crops of clover hay in the same season. It must, of course, be accepted that with each crop removed the soil is impoverished to a certain extent. A top-dressing with some phosphatic fertilizer, such as basic slag, will, however, have a good effect.

FARM BOOK-KEEPING.

"LEARNER," Woodville, writes as follows:—

Will you kindly inform me through the columns of the *Agricultural Journal* of a simple method of book-keeping for everything in connection with mixed farming; also necessary books required; if convenient, kindly give me a few examples.

The Fields and Experimental Farms Division replies,—

Leaflets on farm book-keeping can be procured from almost any stationer. These provide forms for the different items of the farm, as stock, crops, milking, &c.

GREASY HEELS IN HORSES.

"GREENWOOD," Maungatua, West Taieri, writes,—

Could you advise me of a cure for "grease" (greasy heels) in horses?

The Live-stock and Meat Division replies,—

"Grease" is an eczematous condition of the skin about the heels of heavy hairy-legged horses, and in some strains of blood there is undoubtedly a hereditary tendency to it. It is also seen, although less frequently, in lighter-legged horses. The general cause in these cases is irritation of the skin by dirt and wet. The hair-follicles and sebaceous glands of the skin are first irritated and then inflamed. This condition causes an excessive discharge from the glands, and often an enlargement of the parts; in some cases this is so excessive as to form grape-like bunches. Treatment will depend on the stage the disease has reached. Usually in the early

stages a lotion composed of chloride of zinc, 40 grains to the pint of rain-water, applied twice a day, will be sufficient to arrest the condition. The best way to apply it is to sop a piece of cotton-wool in the lotion and apply to the part, securing this by a bandage, which should be applied fairly tight so as to exert a little pressure. If the disease has got to the "grape" stage, these can only be removed by excision or the hot iron. During the treatment the legs should as far as possible be kept clean and dry. Any cracks may be dressed with carbolized vaseline.

LUCERNE.

MR. F. W. CORBAN, Hastings, writes,—

I sowed about three-quarters of an acre of lucerne in the spring. It came away fairly well at the start, but the dry weather and the weeds have been against it. Would it be advisable to harrow it and top-dress it when the ground gets wet; and, if so, when should it be done, and what manure should be used? Clover grows well in this locality.

The Fields and Experimental Farms Division replies,—

The harrowing of your lucerne, giving it one stroke with fairly heavy harrows, would probably have a most beneficial effect. Without a more definite description or knowledge of the land, proper advice cannot well be given of the manure most suitable to use for top-dressing. In your district it would perhaps be advisable to use phosphatic manures with the addition of potash in some form.

CALVES'-FOOT JELLY.

MR. J. PARSONS, "Sarnia," Whenuakura, Patea, writes,—

Where do the manufacturers of "genuine calves'-foot jelly" get their raw material from, assuming that it is made from the feet of young calves? Also, is there a market for same; or could it be made on a dairy farm as a profitable concern? If so, could you tell me where I could get the necessary information, &c., for making it, as we kill something like 100 to 120 newborn calves during the season, and could also get other supplies if it could be made into a business.

The Live-stock and Meat Division replies,—

Genuine calves'-foot jelly is manufactured from gelatine, and not directly from the feet of young calves; therefore it is not likely that the feet of calves slaughtered upon the farms can be utilized for this purpose.

GRASS-GRUB.

MR. J. T. BICKNELL, Kahutara Road, Featherston, writes,—

I have read the article in your March issue on the grass-grub with interest, and per parcel-post herewith send you a tin containing samples of a grub which causes great damage in this locality. This grub, I believe, develops into what is known as the "manuka-beetle," being brown when it first takes wing, and then gradually turning green. In damp seasons the grubs come to the surface in February and March, in dry seasons later, and then they remain in the ground until they take wing. In a cold season the time of flight is generally later than in a warm one. About the end of November and in December the beetle is formed, and they rise then thickest, although a few take wing in January and February. So thick sometimes are these beetles that they resemble a swarm of bees. I have a plantation of mixed trees—gums, pines, wattles, &c.—in which the beetles are very thick, but they have not affected these trees, although I have had the roots of azaleas and other shrubs eaten, and the shrubs so killed. A paddock of grass lately sown down by me and just coming up is now attacked by these grubs, which are in it in hundreds, and quite spoiling it. I shall be very much obliged if you can tell me what to do to get rid of this pest.

The Biologist replies,—

There is really no practical method of dealing with the grass-grub over extended pastures.

ORCHARD DISEASES.

MR. EDWIN ASHBY, Mangatainoka, writes,—

I had several peach-trees this last season that blossomed well, but just as the fruit formed the leaves and twigs turned dark, the leaves and fruit fell off, and some of the young wood died. On several apple-trees also the leaves had brown spots, and the apples were very small and cracked across. If you could advise me what to spray with, and when, I should be obliged. I used Vacuum red oil on apple-trees last winter, but did not spray peach-trees at all.

The Orchards, Gardens, and Apiaries Division replies,—

The peach-trees are evidently attacked by peach dieback (*Clasterosporium carpophilum*). To control this disease the trees should be sprayed in the late autumn, when the leaves have just fallen, with the 10-10-40 formula of the Bordeaux mixture, and again in the early spring, when the buds are beginning to swell, with the same mixture. The apple-trees are apparently attacked by a fungus disease known as apple-scab (*Fusicladium dendriticum*). Spraying the trees in the early spring, when the buds are beginning to swell, with the 10-10-40 formula of the Bordeaux mixture, and later, if the disease appears, with the 4-5-50 formula of the same mixture, should prove effective. Red-oil spray is purely an insecticide for the control of scale, red spider, &c., and must only be used in the winter when the trees are quite dormant.

LUPIN ON SAND-AREAS.

“RETTAN,” “Orongohura,” Kawhia, writes,—

I propose endeavouring to stop drifting sand further encroaching on my property, and would be pleased if you would inform me the best time to sow lupin-seeds, and treatment of seeds previous to planting?

The Fields and Experimental Farms Division replies,—

Lupin is ordinarily sown in the spring, but for the purpose you intend it will be better to sow in the autumn, as there is less chance of wind blowing the sand over the young plants. The seed requires no special treatment previous to planting, but germination could be hastened by soaking in cold water for twelve hours.

PIG-REARING.

MR. T. OSBORNE, Ponsonby, Auckland, writes,—

Will you be kind enough to enlighten me on the following :—

1. Is pig-rearing a profitable business?
2. Which are the best pigs to breed, either for bacon or pork?
3. How many litters a year does a sow have, and what is the best time of the year for her to have them?
4. What is a fair average per litter?
5. If well fed, and well cared for in every way, what is an approximate time before they are ready for market?
6. Do you agree with me that pigs should be fed on root crops; if so, what kind of crops do you suggest? (I might suggest that I believe pigs should be fed on all kinds of crops, and that they should be given to them in various ways, such as a few mangels and carrots one day, turnips and potatoes another day, and a mixture of all the above chopped up small and cooked another day, with an occasional pick at the grass.)
7. If the above food is given, and no milk is available, what would you suggest by way of a drink?
8. What kind of land do you think is suitable, if run on the lines stated.

The Live-stock and Meat Division replies,—

1. Pig rearing and feeding is a profitable business provided the person engaged in the same has some knowledge of the management of pigs, also he must have sufficient land of good quality to grow some of the food required for the pigs. Pig rearing and feeding is the same as any other branch of farming: to be successfully

undertaken a person must have a knowledge of agriculture in general whereby he can grow the food required at the lowest cost possible combined with efficient production.

2. The best pigs would be pigs of a pure breed ; thereby the sale of purebred boars and sows would materially assist the returns. The breed chosen should be one quick in reaching maturity, and one in which the laying-on of flesh and fat is rapid. Berkshires are no doubt one of the best breeds, both for bacon and pork ; however, if they are allowed to mature before being fattened they are prone to lay on fat at the expense of the flesh. Berkshires cross exceedingly well with other pure breeds (especially the Tamworth and Large Black), and the produce when skilfully managed will weigh at four months old dead-weight 84 lb. and upwards. Therefore the herd should be partly composed of purebreds and crossbreds to obtain the best results, but in no case should the breeder go beyond crossing with two pure breeds, as thereby a mongrel is bred, which is unprofitable.

3. A sow comes in season for the first time after breeding (according to condition) about three days to a week after the little pigs are weaned. The period of gestation is sixteen weeks. A sow may be made to have five litters in two years in place of two in one year ; this is brought about by commencing to feed the young pigs on milk at two or three weeks old and gradually thickening with oatmeal porridge, and after a few days turning the sow out during the day and feeding her liberally. She would then come into season again before the young are weaned. (Young pigs should be weaned at about six weeks old.) Spring and early autumn are the best times of the year for sows to bring forth litters.

4. For a young sow on her first litter a fair average would be six to eight, and each litter afterwards ten to twelve.

5. If for bacon, between six and seven months old ; they should then dress to a weight of 168 lb. to 196 lb. Porkers from three to four months old should dress from 56 lb. to 75 lb.

6. Pigs can be fed on root crops such as mangels, carrots, turnips, potatoes, and cabbages. Roots are best given uncooked, but raw potatoes should never be given to pigs. The best results are obtained by mixing meal (dry) with pulped roots, allowing the meal and roots to lie from one meal-time to another. The meal suggested may be a mixture of pollard, maize, crushed peas, or barley-meal. Pasteurized skim-milk and whey, fortified with an effective substitute for the extracted butter-fat or casein, is, however, a diet on which very good pigs can be raised. When pigs are grazing there is a danger of their being made to take too much moisture if the food is given wet. The pig is an animal with an exceedingly small stomach. The best results have been obtained by not giving too much bulk of food. In some of the large pig-feeding districts of America excellent results are obtained by feeding with concentrated food, such as ground oats, and, as stated above, given in a dry state. If too much moisture or liquid food is given it is washed into the intestines before it is thoroughly digested.

7. If the above principle of feeding is carried out, unless the weather is exceedingly dry, very little drink is required if the pigs are on grass. Swill with a little meal added would be the best drink.

8. The land should be of good quality capable of growing good crops. The paddocks on which pigs are running should be well drained so that they can have dry camps. No animal is more injuriously affected by damp than the pig.

The Government of India has passed an Act for the promotion of thrift and self-help among agriculturists, artisans, and persons of limited means. It will generally affect the co-operative credit societies, which so far in India have usually been based on the principle of unlimited liability of the members for the debts of the societies ; indeed, of the 7,562 rural societies of India, 7,239 are formed on this principle. It is said the members greatly value the audit, inspection, and advice of the official staff, which is entirely composed of Indians, who travel about the country examining the affairs of existing societies, and aiding in the establishment of new ones.

COMMERCIAL REPORTS.

THE HIDE MARKET.

IN view of the enhanced value of hides and skins on New Zealand markets, the Director of the Live-stock and Meat Division of the Department, Mr. C. J. Reakes, D.V.Sc., M.R.C.V.S., asked Mr. A. Crabb, M.R.C.V.S., the Government's London Veterinary Officer, to investigate the hide and skin position in Great Britain. Mr. Crabb's report is as follows:—

I note the conditions existing in New Zealand, as described in your memorandum, and find, on making inquiries, that a similar state of affairs obtains here—namely, that values have had an upward tendency for some considerable time, that the demand undoubtedly exceeds the available supply, and that it is considered more than likely that such conditions will not only continue but may probably become more acute.

Dealing first with the actual prices: An examination of the ordinary market quotations shows that the value of hides has been increasing more or less regularly for some years, and the following extract from the *Leather Trades Review* of November, 1912, shows the position: "Since February last, hides have gone up as much as $\frac{3}{4}$ d. per lb. From 1894 to 1906 the prices went up steadily, dropped slightly in 1907, since when they have ruled gradually higher until, in the spring of this year, they touched 7d. To-day, $7\frac{1}{4}$ d. has to be paid for hides of good quality."

The above refers to Great Britain, while an American report of October, 1912, states, "Market active; prices high—fully $\frac{1}{2}$ d. higher than record prices of 1909; up to 19 cents."

As an illustration of the more or less steady increase in value the following quotations may be of interest; they are London prices and refer to ox and heifer hides (first); but a similar rise in price is noted in hides of all grades:—

				90 lb. and upwards.	59 lb. and under.
				Per lb.	Per lb.
January, 1909	..	..	..	$5\frac{1}{4}$ d.	$4\frac{1}{4}$ d.
" 1910	..	..	..	$6\frac{1}{4}$ d.	$5\frac{1}{2}$ d.
" 1911	..	..	..	$5\frac{1}{4}$ d.	$5\frac{1}{4}$ d.
" 1912	..	..	..	$5\frac{1}{2}$ d.	$5\frac{1}{4}$ d.

During the year 1912 the rise in value was very marked, the price increasing month by month until in December last 90 lb. and up were quoted at $7\frac{3}{4}$ d. and lighter weights at $7\frac{1}{4}$ d. per lb. During this month the prices have eased slightly, the latest quotations being $6\frac{3}{4}$ d. and $6\frac{1}{4}$ d. respectively; even this, however, being an increase of $1\frac{1}{2}$ d. to 2d. per lb. in four years.

As to the cause, I find that this question has been exercising the minds of those interested in this country for some considerable time, and various reasons have been given for the disturbed state of the market: it is not, however, considered to be due to any trust or market manipulations, but the result of a genuine and gradually increasing shortage.

Statistics show that in most countries the increase in the number of cattle is not in proportion to that of the human race, and that *there are now less cattle per thousand of the population than was the case some years ago*. Other contributing conditions are (as in New Zealand) increase of dairying resulting in decrease in weight of hides, increase of individual wealth and of demand for luxuries, the last named involving a decided increase in the uses to which leather is put.

Again quoting from the *Leather Trades Review* of November, 1912, I find the position dealt with as follows: "Owing to a variety of causes, one of them being the rapid development of the motor-car industry, there is an unprecedented demand for leather and a great shortage of hides . . . there is apparently not the slightest likelihood of any drop in prices taking place; indeed, the tendency is rather the other way."

Then, dealing with the cause, the same report continues, "A greatly increased demand has, doubtless, contributed something to the shortage of hides, but the more important factor is that, both here and abroad, fewer cattle are being reared. In America alone during the last twelve years, while the population has increased 25 per cent., the supply of cattle has shrunk by 7 per cent."

As illustrating the smaller proportion of cattle to population, the following figures, although it has not in all cases been possible to bring them right up to date, will be of interest :—

—	Cattle.	Population.	Number of Cattle to each 1,000 Inhabitants.
United Kingdom :—			
1895	10,800,000	38,800,000	278
1904	11,600,000	42,700,000	271
1911	11,860,000	45,360,000	261
United States :—			
1890	57,600,000	67,600,000	852
1900	62,000,000	75,600,000	820
1910	69,000,000	91,900,000	750
Argentine :—			
1888	27,500,000	4,600,000	5,978
1904	33,000,000	5,900,000	5,593
Australia :—			
1893	11,600,000	3,090,000	3,754
1911	11,740,000	4,470,000	2,626
New Zealand :—			
1904	1,700,000	800,000	2,125
1911	2,020,000	1,050,000	1,923
India :—			
1898	87,000,000	228,500,000	381
1903	85,100,000	231,800,000	367

On the other hand, Canada and Russia show a slight increase in the number of cattle, as under :—

—	Cattle.	Population.	Number of Cattle to each 1,000 Inhabitants.
Canada :—			
1901	5,600,000	5,600,000	1,000
1911	7,900,000	7,200,000	1,097
Russia :—			
1888	27,600,000	102,000,000	269
1904	33,200,000	116,000,000	286

The increases, however, have not been sufficiently large to balance matters, as from the latest statistics available the proportion of cattle to inhabitants of the whole world is as follows: In 1880 there were 192,000,000 cattle as against a population of 411,000,000, or 467 cattle to every 1,000 inhabitants; in 1908 the figures were 269,400,000 cattle to 572,700,000 people, or 383 cattle per thousand.

IMPORTATION OF FROZEN MEAT TO SPAIN.

In forwarding a copy of a despatch on the above subject from H.M. Ambassador at Madrid, the High Commissioner writes as follows :—

It will be noted that the Ministry of the Interior has not yet come to any decision on the question of permitting the importation of frozen meat, although, as is known, the subject has been under discussion for some good length of time. While on the point I might mention that frozen meat was included in the new Customs tariff of Spain, which came into force on the 1st January, 1912, the item reading "Fresh or frozen meat," whereas in the 1906 tariff "fresh meat" only was provided for. The new duties, too, were made 12 pesetas (gold) per 100 kilos (= 4s. 10½d. per cwt., or rather more than ½d. per lb.) as against the old tariff of 14 pesetas, so that there would seem to be some little ground for the belief expressed by the member of the Royal Council of Health that permission for the importation of frozen meat in some form will probably be given.

GERMANY'S CONSUMPTION OF FIBRE.

The following report on the fibre position in Germany is furnished by H.M. Ambassador at Berlin :—

None of the leading German industries are so thoroughly dependent upon foreign supplies for their raw materials as the textile industry in its various branches. Practically none of the raw materials needed are produced at home. Wool, flax, and hemp were originally home-grown, and to a certain degree this is still the case, but the quantities so produced have become insignificant, and official statistics so far as flax and hemp are concerned have been discontinued altogether.

Experiments are from time to time made to discover German-grown plants the fibre of which could be used by the textile industry. Among the more recent efforts in that direction figure nettle (*Urtica*), broom (*Genista*), and certain barks of trees. These attempts have not, however, matured into practical importance. Only two fibre-plants are at present produced in Germany—viz., flax (*Linum usitatissimum*) and hemp (*Cannabis sativa*).

The last official return concerning the cultivation of flax and hemp in Germany was published in 1902, and referred to the cultivation in 1900. The totals, compared with previous returns, are as follows :—

Year.					Flax. Hectares.	Hemp. Hectares.
1900..	..	..	..	..	33,662.5	3,537.4
1893..	..	..	..	..	60,956.0	7,921.3
1883..	..	..	..	..	108,297.2	15,255.1

(1 hectare = 2.42 acres.)

This clearly shows the retrogression in the areas of cultivation, and it is generally believed that since the last return the cultivation of both plants has further and rapidly receded.

The following figures show the imports and exports of flax into and from Germany in 1911 and 1910 :—

Imports.					Flax.	Hemp.
Year.						
1911 ..	..	..	..	..	73,797.3	62,821.4
1910 ..	..	..	..	..	72,307.8	50,508.6

Exports.					Flax.	Hemp.
Year.						
1911 ..	..	..	..	..	26,371.2	11,638.1
1910 ..	..	..	..	..	27,677.7	9,369.8

APPLE EXPORT TRADE.

Mr. E. Rabbits, formerly an Orchard Instructor of the Department, stationed for some years in the Marlborough District, visited Great Britain during the latter part of last year, and took advantage of the opportunity to learn something of the fruit trade on oversea markets. In a letter on the subject to the Director of Orchards, Gardens, and Apiaries Division of the Department, Mr. T. W. Kirk, Mr. Rabbits conveyed some instructive observations. He writes,—

The vessel by which I travelled to London was the "Corinthic," which left Wellington on the 16th May of last year. She carried 15,000 cases of Tasmanian apples, transhipped at Wellington, and a few hundred cases of New Zealand apples from Hawke's Bay, all the fruit being for South America. It was carried as ordinary cargo, being distributed in three holds. Two of these were never uncovered for ventilation purposes, and when opened up at Rio de Janeiro the top cases were sodden with moisture, being nearly black with discoloration, and having a thick coating of mould on them. The after hatch, which had been ventilated, opened up in good order. At the South American port the steamer has to lie off a considerable distance and the cargo is discharged into lighters. The handling by the Natives is anything but satisfactory. I noticed that among the cargo for Rio de Janeiro was seven or eight large cases of fruit-trees (500 trees to a case) from a Victorian nurseryman, so that evidently South Americans intend to extend their own fruitgrowing industry. I was also informed that a New Zealand nurseryman is visiting the Argentine in order to establish a connection with growers there for nursery stock.

On arrival in England I spent some time at Covent Garden, and came into touch with a number of salesmen there. At their request I furnished them with the names of several leading fruitgrowers in the Nelson District, to whom they intend, they informed me, to communicate, with the object of establishing a business connection. I gathered one or two useful facts at Covent Garden. The most important is that it is useless shipping New Zealand fruit to the Home market to arrive at a time when the English fruit is coming in, such as strawberries, cherries, gooseberries, raspberries, &c. Complaint was made by several brokers of New Zealand apples reaching the market in a shrivelled condition. This suggests the question, Are we shipping the right varieties? Then there is the question of shipping certain varieties at the wrong time. It is useless expecting apples to open up in the pink of condition on the London market if they are shipped before they are properly matured. For instance, I picked a case of well-matured Sturmers from my fruit-garden, with the intention of using them on the voyage. But, with the object of testing this question, I made arrangements, after the fruit had been in cabin a fortnight, to have it carried in the vegetable-room of the steamer. It arrived in England in splendid condition—in fact, appeared a far finer fruit than any of the colonial apples I saw exposed for sale in London. I attribute this solely to the fact that the apples were mature when gathered. Not a single apple out of the case went wrong. Yet I consider that if I had had a shipload of the same fruit on the London market at that time (the end of June) they would not have brought a top price, owing to the competition they would have had to meet from Home-grown fruit.

It is interesting to study the various methods by which fruit is disposed of in England in order to cater to different classes of customers. England is a country of social extremes, and very rich people order their fruit regardless of cost, while the majority of people hardly ever have the opportunity of tasting fruit at all. Apples as a rule are sold at so-much for each one, the average being 1d. for a Sturmer Pippin. The most popular-sized apple with the dealers is 2½ in., and the more uniform the apples the better they like them.

The steamer "Ruahine," which sailed from Wellington to London on the 3rd instant, has on board 12,727 cases of apples for Montevideo and 2,375 cases for Rio de Janeiro, these being transhipments from Tasmania.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of March, 1913, of agricultural and farm products:—

Item.	Quantity.	Value.
		£
Bran	Nil	..
Butter	Nil	..
Cheese	10 cwt.	39
Chaff	Nil	..
Fruits, fresh, all kinds	2,140,902 lb.	10,359
Barley	29 centals	25
Oats	9 centals	49
Wheat	7 centals	26
Onions	575 cwt.	159
Pollard and sharps	Nil	..
Potatoes	Nil	..
Seeds, grass and clover	1,580 cwt.	5,117
Total values imported	..	£15,774

THE DOMINION'S EXPORTS TO BRITAIN.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri- gum, Cases.	Sundry.
January,	1913 166,714 1912 237,284	229,179 302,369	6,886 12,424	109,251 114,512	63,864 64,005	118,986 95,994	.. ..	329 ..	.. 7,295	6,969 6,365	2,215 1,942	4,110 3,407	6,611 carcasses pork. 59 "
February,	1913 326,337 1912 205,424	403,698 273,246	12,666 13,052	89,098 101,544	81,733 62,398	127,968 106,074	.. 607	.. ..	.. ..	12,520 6,831	4,295 1,615	7,973 1,056	64 carcasses pork. .. "
March,	1913 86,224 1912 324,192	210,166 518,402	7,428 20,201	47,560 64,925	59,844 49,308	49,661 70,022	.. ..	115 4,960	.. ..	12,552 3,832	7,662 1,352	4,043 2,644	250 carcasses pork. 16 "
April,	1912 213,178 1911 172,503	355,829 491,413	7,046 19,106	38,986 14,823	38,137 33,411	31,615 42,917	4,905 38,456	2,180 6	.. ..	5,134 9,233	1,958 1,827	4,458 2,577	2,431 carcasses pork. .. "
May,	1912 454,506 1911 204,390	744,287 377,105	32,691 20,173	1,441 995	40,535 20,732	51,833 33,033	11,157 93,854	26,569 ..	1,500 ..	11,963 7,443	2,826 1,210	6,287 7,720	1,087 carcasses pork. .. "
June,	1912 170,738 1911 214,079	287,697 448,432	24,605 15,789	558 ..	7,712 6,323	18,138 19,568	9,160 39,422	7,622 ..	2,039 14,128	5,646 4,763	1,168 525	1,213 5,528	221 carcasses pork. 2,434 "
July,	1912 291,097 1911 206,869	371,474 260,761	29,457 14,296	684 ..	1,255 276	16,567 14,100	44,324 29,452	23,215 ..	20,573 10,334	7,463 6,022	1,856 1,073	5,892 2,786	210 carcasses pork. 175 "
August,	1912 207,239 1911 66,608	157,589 110,054	10,478 3,653	559 ..	.. ..	10,409 5,260	42,580 31,976	38,802 ..	19,562 18,231	3,768 3,443	523 303	4,219 3,475	203 carcasses pork. .. "
September,	1912 44,657 1911 102,081	40,759 40,057	1,174 6,059	8,723 6,404	1,204 ..	6,671 7,390	15,742 38,151	17,363 ..	19,983 33,059	2,967 5,604	501 393	8,671 7,672	220 carcasses pork. .. "
October,	1912 51,263 1911 9,417	15,393 2,043	3,882 100	49,962 49,626	16,389 11,501	4,647 2,162	7,952 ..	64,480 ..	5,396 32,094	4,193 4,514	401 754	9,075 2,982	 "
November,	1912 54,175 1911 47,770	8,286 10,427	282 403	140,751 135,741	57,181 57,319	33,305 44,934	3,680 15,833	40,896 ..	13,892 16,606	9,866 7,844	1,911 2,183	5,466 3,085	 "
December,	1912 117,740 1911 72,192	106,310 91,965	4,774 765	119,885 109,397	66,213 46,883	44,789 54,297	5,868 ..	30,490 ..	10,070 4,366	8,816 5,719	2,613 1,364	3,686 2,708	 "

HEMP AND TOW GRADING RETURNS.

MARCH.

Hemp.—The total number of bales graded was 17,553, as compared with 9,343 for the corresponding month of last year, an increase of 8,210 bales. For the twelve months ending 31st March, 1913, the number of bales graded was 120,542, as compared with 85,684 for the previous twelve months, the increase being 34,858 bales.

Tow.—During the month 6,439 bales were dealt with, as compared with 2,678 for the corresponding month of last year, an increase of 3,761 bales. For the twelve months ending 31st March, 1913, the number of bales graded was 39,933, as compared with 23,433 for the previous twelve months, the increase being 16,500 bales.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF MARCH, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	581	2,598	600	50	28	3,857
Napier ..	..	189	184	76	..	..	..	449
Foxton ..	..	..	942	2,962	284	6	..	4,194
Wellington ..	..	..	1,140	3,583	596	11	..	5,332
Blenheim ..	..	60	111	55	..	..	..	226
Picton ..	..	178	71	252	114	..	..	615
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	22	246	452	23	..	..	743
Bluff ..	..	..	379	1,686	72	..	..	2,137
Totals ..	..	451	3,654	11,664	1,689	67	28	17,553
Percentages of totals	..	2.57	20.82	66.45	9.62	0.38	0.16	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	9	424	1,025	264	1,722
Napier ..	..	94	60	..	154
Foxton ..	137	628	252	11	1,028
Wellington ..	269	1,143	616	60	2,088
Blenheim ..	46	21	68	..	135
Picton ..	115	47	62	..	224
Lyttelton ..	..	..	..	..	..
Dunedin ..	..	74	181	..	255
Bluff ..	14	285	467	67	833
Totals ..	590	2,716	2,731	402	6,439

Stripper-slips.—Passed for shipment: Auckland, 85; Napier, 12; Foxton, 390; Wellington, 800; Blenheim, 16; Picton, 2; Dunedin, 11; Bluff, 81—total, 1,397. Condemned: Auckland, 18; Foxton, 107; Wellington, 89; Dunedin, 4; Bluff, 17—total, 235.

NEW ZEALAND-SAN FRANCISCO SUBSIDIZED STEAM SERVICE.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti, and transshipments for Vancouver from New Zealand, since December last:—

	"Moana," 6th Dec.	"Aorangi," 3rd Jan.	"Tahiti," 31st Jan.	"Moana," 28th Feb.	"Aorangi," 28th March.
Gum, packages ..	13	..	20	20	50
Seeds, sacks ..	..	..	..	..	31
Grain, &c., sacks ..	79	343	69	324	57
Meats, cases ..	413	523	272	100	262
Onions, cases ..	3	6	52	1,759	10
Potatoes, sacks ..	26	11	24	2	32
Sundries, packages ..	562	948	126	54	131
Butter, boxes ..	7,410	5,894	7,782	7,281	3,783
Hemp, bales ..	281	173	296	282	..
Frozen lamb, carcasses ..	..	..	3	2	3
" veal, ..	..	..	71	..	..
" beef, quarters ..	..	..	489	150	..
" sundries, packages ..	..	..	..	2	..
Timber, pieces ..	..	..	1,440	..	93

NEW ZEALAND-VANCOUVER TRADE.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since October last:—

	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.	"Zealandia," 14th Feb.	"Marama," 14th March.
Butter, boxes ..	9,777	5,945	11,377	10,960	5,205	9,402
Eggs, ..	226	..	..	..	..	..
Beef, quarters ..	..	..	580	716	..	1,254
Veal, carcasses ..	..	..	393	276	181	400
Frozen sundries, packages ..	12	5	12	..	39	147
Wool, bales ..	..	6	20	30	..	..
Grass-seeds, beans, &c., sacks ..	50	177	..	..	54	..
Hides and skins, sacks, &c. ..	721	559	595	329	583	..
Onions, cases ..	..	..	..	14	1,572	..
Sheep-skins, bales ..	138	..	..	24	112	..
Jam, cases ..	125	100	50	50	75	175
Sundries, packages ..	21	329	92	313	250	214
Potatoes, crates ..	23	..	165	20	..	..
Kauri-gum, packages ..	46	53	21	..	176	41
Hemp, bales ..	..	..	..	246	129	126

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of March :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
4	Shorthorn ..	Heifers ..	Sydney ..	J. Fisher ..	Cambridge.
SOMES ISLAND (WELLINGTON).					
2	Holstein ..	Bulls ..	San Fran- cisco	W. Barton ..	Featherston.
9	" ..	Heifers ..	Ditto ..	G. L. and S. J. Sievers	Carterton.
1	" ..	Bull ..	" ..		
2	" ..	Heifers ..	" ..	Ditto ..	Stratford.
1	Airedale terrier	Male ..	London ..	McMillan and Fre- deric	
1	Ditto ..	Female ..	" ..	Ditto ..	
QUAIL ISLAND (LYTTELTON).					
2	Guernsey ..	Heifers ..	Melbourne	Dalgety and Co. ..	Christchurch.

H.M. Consul-General at Chicago, in a report dated the 9th January, states that the number of cattle received for packing purposes during 1912 was 1,681,136, compared with 1,715,279 in 1911; of calves, 482,932, compared with 493,561; of swine, 5,998,782, compared with 5,929,585; and of sheep, 4,880,873, compared with 4,452,821. The total of all kinds was 13,043,723 in 1912, and 12,591,246 in 1911.

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Changing Pastures on a Dusty Day.



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PRICE,
SIXPENCE.

SHEEP - BREEDING.

J. L. BRUCE.

STOCK-BREEDING A NATIONAL INDUSTRY.

THE subject of first importance to the farmer of New Zealand, and indirectly to the Dominion, is that of stock-breeding. Primarily a grazing-country, our chief concern should be the maintaining of our flocks and herds at a high standard of excellence. The breeding of sound and profitable animals is a necessary corollary to successful farming in any land, but to New Zealand, situated so far from its main markets, with keen rivals to face, and with the cost of production generally on a high plane, it is imperative that the choicest quality of product must be obtained if success is to attend our operations. In the important work of sheep-breeding we have many difficulties to face. The successful breeding of animals is not a business that can be learnt from the best work ever written, or, indeed, in

many cases even though an apprenticeship were served in a sound practical school. Remembering this, and that in this young country many of our farmers have not graduated on the land, but have taken up pastoral pursuits practically as novices, it would be surprising were all the men breeding sheep in New Zealand capable of producing the best types of animals, or even of observing the elementary rules necessary to the maintenance of good type and constitution. Education is necessary if a general appreciation of the importance of observing the accepted principles in breeding is to be secured. In this connection it is much to be desired that reform should be effected in the method of judging sheep at our agricultural shows. If the exhibits are to merely interest competing breeders or even competent authorities the present system may serve a purpose; but if the bulk of our farmers are to gain any information the reason for the awards should be plainly stated, so that any visitor may understand the placing of the different awards and thus secure some benefit from the competitions. Students' judging competitions should also be encouraged more by our agricultural societies, and generally definite effort should be made to bring prominently before our sheep-farmers a sound knowledge of the ideals to be aimed at in breeding.

MAGNITUDE OF THE INTERESTS AT STAKE.

A few figures will indicate the great importance of the sheep-breeding industry, and the dominant part it plays in our national prosperity.

The total number of sheep in the Dominion at 30th April, 1912, was 23,750,153.

The exports for twelve months ending 31st March, 1912, were as follows:—

Mutton and lamb exported and locally consumed,	£
6,138,176 carcasses, value	4,447,042
Sheep (live) exported, 7,855, value	40,000
Wool exported, 176,963,607 lb.; locally utilized,	
206,250 lb., value	6,785,234
Skins, pelts, fat, and by-products, value	943,183
	£12,215,459

From the above figures it will be observed that the amount received from wool, mutton, and by-products is equal to about 10s. 3d. per head on the flocks of the Dominion. To further demonstrate the

stability of this industry and the marvellous recuperative capabilities of our flocks the following figures may be of interest:—

Year.	Number of Sheep.	Number of Breeding-ewes.	Percentage of Breeding-ewes.	Exported and locally consumed.	Percentage withdrawn from Flocks.
1907 ..	20,983,772	10,736,846	51.12	6,156,471	29.33
1908 ..	22,449,053	11,244,041	50.08	6,011,587	26.33
1909 ..	23,480,707	12,370,346	52.68	5,913,515	25.18
1910 ..	24,269,620	12,515,380	51.07	6,544,171	26.90
1911 ..	23,996,126	12,324,463	51.35	7,447,704	31.03
1912 ..	23,750,153	12,277,029	51.69	6,307,398	26.55

It will thus be seen that the average number of sheep withdrawn from our flocks annually for export and local consumption is about 27½ per cent., and, after making a reasonable allowance for deaths from all causes, it will be seen that the total number of sheep in the Dominion is absorbed and replenished every three years.

It may be argued that the above figures reveal stagnation. As a matter of fact, some pessimistic critics in the Home-country, evidently without full knowledge of the conditions or capacity of the Dominion, and even some within its borders with possibly less knowledge of the subject, have recently been ventilating erroneous statements, concluding that the sheep industry of New Zealand had reached its maximum. To those who are conversant with the subject such assertions scarcely require refutation, but to those interested, and who may be less familiar with the possibilities of the country for the expansion of the industry, a brief review of the prospects and conditions favourable to its further development may be of interest. The rapid progress of the dairy industry during the last few years has to some extent retarded the increase of the flocks. In a young country, notwithstanding the wonderful facility of its inhabitants to meet altered conditions, some little time is required for readjustment, and no doubt this is to some extent accountable for the seeming present lack of buoyancy in the exports of sheep-products or the number of sheep. Nevertheless, when it is remembered that out of the 40,238,000 acres shown by statistics as being under occupation (a large portion of which is only now commencing to recover from the ravages of the rabbit pest) only about 16,266,000 acres are nominally under cultivation (but a small portion, however, being under close cultivation), of which area about 14,000,000 acres are in grass, and, further, that of the whole area under cultivation less than 1,000,000 acres are in green crops and a much smaller portion still under anything approaching regular intensive cultivation, the marvel is that the carrying-capacity is what it has been. It should be apparent to any one who has studied

the subject that the area (so called) under cultivation is easily capable, under more intensive and thorough cultivation, of carrying at least 50 per cent. more sheep. Again, take the millions of acres of unoccupied lands in the North Island awaiting development, much of which will become ideal sheep-country, it is no optimistic prediction to assert that this country is easily capable of carrying not 24,000,000 but 50,000,000 sheep, and still provide excellent scope for the expansion of the dairy industry on the rich low lands less suitable for sheep but eminently adapted for dairying.

Much has been written concerning our great primary industries, all of which add more or less to the aggregate of the Dominion's wealth, but when the magnitude of the above figures is considered the sheep industry is seen to still command the leading position. The importance of this particular industry being manifest, it may be asked why so little literature of a practical nature is available for the guidance of those already engaged in it or those who contemplate taking it up. The answer is that the management of sheep is a business demanding experience combined with keen powers of observation and a natural intuition for it. Without the possession of these, any literature, no matter however practical, would possibly be more detrimental than advantageous. Further, the conditions appertaining to the management of sheep are so varied that, unless in answer to a specific question, nothing beyond generalities on the broadest lines can be given with safety.

NEW ZEALAND A NATURAL HABITAT OF THE SHEEP.

The remarkable success of the sheep industry in this country is due to several leading factors: the soil and climate are eminently suitable for sheep-breeding; the men who founded the industry, and have since controlled its destinies, have thoroughly understood it; and the discovery of artificial refrigeration made possible the exportation of meat, and thereby provided the final requirement to a successful enterprise.

THE MEN TO BE HONOURED.

In any reference to our great sheep industry the splendid foundation laid by our pioneers must not be overlooked. Of the work of establishing agriculture in New Zealand but few records have been handed down to us; but it is with pride we recall the fact that the founders of the agriculture of the Dominion were of the best blood of the Old Land. They brought with them not only a knowledge of how to till the soil, but that inherited love for live-stock, and skill in breeding it, which is one of the traditions of the British race. They possessed the

characters which have made British farmers the stud-masters of the world. Men of all branches of the British race have contributed to the building-up of New Zealand agriculture, but if there is one type which deserves more than passing reference it is the Scottish shepherd. Some of the finest flocks and herds developed in this country owe their pre-eminence to the fact that the owners were, or had the assistance of, men who had herded sheep on the hills and in the glens of Scotland, and to this day these Scottish breeders hold a dominant position in the live-stock world of the Dominion.

WHAT DECADENCE OR IMPROVEMENT MEANS.

As an illustration of the importance and extent of the industry and what its progress or decadence means not only to those directly interested, but to the community generally, it might be pointed out that in wool alone an increase of production of 1 lb. of wool per sheep, at 9d. per pound, represents a sum of £862,500, to which may be added as a sequence of the improved productive power a corresponding improvement in quality representing, say, 1½d. per pound, which, based on an average clip of 7 lb. of wool, would give a further increase of £1,006,250, making a total of nearly £2,000,000 sterling to the credit of the producers. On the other hand, a decadence means a corresponding deficit. While admitting, that a united and fairly strenuous effort may be necessary to accomplish the former, it would require no great mismanagement or length of time to accomplish the latter. Briefly, it is possible through wool alone, without increasing our present numbers of sheep, to affect the financial position of the country by nearly £4,000,000 sterling per annum, by either attaining a reasonable maximum production on the one hand, or an easily attainable decadence on the other.

FLOCKS A CREDIT TO THE DOMINION.

At no previous time have the leading stud flocks of the Dominion attained a higher standard of excellence than obtains at the present time. A visit to a few of the principal agricultural and pastoral shows will satisfy the most critical judge that in no industry in this, or perhaps any other, country do those concerned know their business better than a very large proportion of New Zealand stud-sheep breeders; and to further realize the energy of stud-sheep breeders in maintaining the high standard of their stock one has only to observe the continuous importations into the Dominion of the very best blood from Great Britain; and to further safeguard this branch of the industry the New Zealand sheep-breeders' associations are doing excellent work. It is held by some that the good work done by the associations is

capable of wider expansion, but whether this is so or not need not be here discussed. Suffice it to say it is abundantly evident that our stud sheep, which are the foundation of the flocks, are of the highest standard quality; therefore with ordinary care there is no reason to expect other than a steady improvement in the quality of our flocks.

With regard to ordinary flock sheep the case is rather different, due in great measure to the necessary evolution taking place in the business of sheep-farming, as a result in the first place of the development of the mutton and lamb trade following on the establishment of the freezing industry, and, later on, of the rapid expansion of closer settlement, which has created a large community of farmers who are forced, by reason of the value of their land and the limited area of it, to specialize in the fattening of sheep and lambs, and must therefore leave to others the breeding of their ewes and rams. Assuming, for the sake of argument, that, as a natural sequence, under these circumstances some deterioration may take place, the points of weakness to be detected and rectified may be considered. What may be expected as the outstanding symptoms? Hereditary traces of many breeds, absence of uniformity both in size, character, and type, shrinkage in wool-production, and much of this showing almost every conceivable grade from fine combing to coarse hair of various colours. It would be evident, therefore, where such conditions have prevailed that degeneration must have extended back over several generations; and if the ewes were the progeny of those bred on the same holding for several generations it would be reasonable, seeing that the rams in a sense represent half the flock, to inquire what rams had been used. In the large majority of cases where deterioration in a flock had taken place it would be found that the indiscriminate selection of rams had been the crux of the whole matter, and there is little doubt that the principal factor had been the extensive use of inferior or unsuitable rams. It is noticeable that some flockowners will not pay a reasonable price, even from, say, £3, for a decent ram, preferring to buy an inferior animal of almost any breed or breeds for 15s. or £1. In such cases, if deterioration is to be avoided, owners would do well to change their methods and to carefully watch their flocks.

It is said, and with considerable truth, that "half the breeding goes in at the mouth." While it cannot be altogether gainsaid that the intelligent feeding of any stock is a most important factor, it is a fact nevertheless that, no matter how well fed, unless sheep are bred on proper lines the final result must be retrogression.

An important factor in the sheep industry is the steady diminution of the Merino flocks in the South. Merino ewes are becoming more

difficult to obtain every year. This means that prices are increasing correspondingly, hence there is a growing difficulty of maintaining half-bred flocks which have been, in the South Island in particular, the foundation of our crossbred flocks both for wool and mutton.

When it is remembered that of the world's supply of crossbred wool New Zealand takes the lead for quality (a fact freely admitted by the trade), it behoves us to endeavour to maintain this enviable position. Can we do so? Judging from what has been accomplished, everything points to a steady improvement in the best grades of this class of wool, and credit is due to the flockowners who, with careful study and long experience in mating their sheep, assisted by the suitability of the soil and favourable climatic conditions, have brought about the existing high standard of our crossbred wool. Notwithstanding the fact that the Merino is decreasing in numbers, the nature of large pastoral areas is such that it may reasonably be expected that a sufficient number of Merino sheep will always be maintained to keep up the foundation so essential to the highest grades of this wool.

THE RAM TO LOOK FOR.

The fact that the ram is the dominating factor in deciding the destiny of the flock suggests to those just entering upon pastoral pursuits, or to some who may have fallen victims to the results of indiscriminate mating, the importance of the question how to select a ram. A few points regarding some of the most popular breeds and crosses is given at the end of this article, but a few of the more important features bearing on the selection of flock rams of any breed might be given here, viz.: The ram should be purebred and true to type, with a strong, bold carriage; of a decidedly masculine character, showing marked individuality and uniformity; of a medium-sized build without a tendency to be undersized; well set on his legs, indicating strength and thriftiness; well ribbed up, with deep full quarters and well-developed thighs both inside and outside. The head should be decidedly masculine, being at the same time clean and full of character, and should be carried on a powerful neck, well set into the shoulders. A weak neck should never be tolerated. The eyes should be bright and reasonably prominent, with nothing sluggish in their appearance; *in short, he should be a ram, every inch of him.* The wool should show density of fibre, good length of staple, and be of as uniform quality all over the body as can reasonably be expected, with as little tendency to coarseness about the thighs as possible. Every ram should be carefully examined before purchase for the presence of hair on any part of the body and promptly rejected if showing signs of kemp. *Never buy an old ram.*

A PARTICULAR BREED MUST HAVE A SUITABLE ENVIRONMENT.

A factor to which more importance will have to be attached is the allocating of the different breeds of sheep to country to which they are naturally adapted, and the reservation of suitable areas upon which they can be profitably bred. Take, for example, the Merino, which has been (and in the writer's opinion there is nothing yet in sight to take its particular place) the foundation of our export trade in wool, and to some extent in that of mutton: As already mentioned, the Merino is steadily decreasing in numbers, two of the chief causes possibly being the subdivision of suitable pastoral country for closer settlement, and that half-breds bring better prices. Fortunately for the future maintenance of the Merino as the foundation of southern commercial flocks, large areas of the back country in the South eminently suitable for this breed are unsuitable for closer-settlement purposes, and, so far as one can see, will always remain the home of the Merino. If so, this will be to some extent the means of conserving this valuable sheep, and make it obtainable at prices within the reach of the low-country sheep-farmer who looks to it to renew his crossbred flock. With careful adjustment of areas according to carrying-capacity and proper allocation of the flocks according to their natural requirements, the pastoral lands of the Dominion will always be the nursery of our mutton and wool industry. Next in order come the small grazing-runs of the South Island with their half-breds, and in the North the Romney and Lincoln crosses: next the semi-pastoral areas of second-class lands with the class of crossbreds favoured in the respective Islands, lands with considerable fattening capabilities; and next, and last, the first-class lands and purely agricultural areas, which are essentially the centre of the fat-lamb industry, the fattening-ground of our frozen mutton and the home of the long-woolled stud flocks. Under the above process a steady migration of the flocks is taking place, each class of country fulfilling its part in this great national industry: and with careful selection and mating at the hands of owners there need be no pessimistic apprehensions concerning its future.

SYSTEMS OF CROSSING RECOMMENDED.

For the information of the more or less inexperienced sheep-farmer, the following is a list of a few crosses which may assist as a guide of what to do and what not to do:—

A profitable and popular form of mating sheep for comparatively dry southern pastoral country: Purebred English Leicester, Border Leicester, or Lincoln ram to purebred Merino ewes—progeny half-bred.

Half-bred ewes put to English Leicester, Border Leicester, or Lincoln ram (continue with ram of same breed as in the original cross)—

progeny crossbred. For purely flock purposes continue on these lines. The progeny of the Lincoln ram make good commercial sheep, but unless the ewes are exceptionally strong and "roomy" a heavy death-rate at lambing is almost inevitable.

To keep up a crossbred flock a number of half-bred ewes should be bred every year, as after several crosses the progeny will have lost its more marked Merino characteristics to a considerable extent.

"Come-backs": Some flockowners seem to have been fairly successful in what is known as the "come-back" system—that is, when Merino ewes have been unobtainable, to use a Merino ram on well-bred ewes which have practically lost their Merino characteristics. This is generally recognized as crossing the wrong way, and to be adopted successfully requires the very greatest of skill and care in culling.

In the more moist hill country of the North Island a Romney Marsh ram should be used in place of those breeds recommended for dry country. The fact should be emphasized here that the Romney to be used in such cases should be of the dense-woolled active type.

Romneys or Lincolns, comparatively pure, are particularly adapted for heavy low country, especially in a fairly moist climate. Judging from present indications, the former breed of sheep, owing to its marvellous adaptability to conditions vastly different to its original habitat, is possibly destined to be the predominating breed in many districts of the Dominion, more particularly so in the North Island.

Purebred Shrops, Downs, and other dark-faced breeds are excellent sheep on suitable country; and to breeds of this type, mated with crossbred ewes, the high standard of our frozen mutton, especially lamb, is largely due; but great care should be taken to see that none of these crosses are allowed to remain in the flock for breeding purposes.

Indiscriminate crossing should be avoided, and those who may find it necessary to purchase breeding-ewes should avoid saleyard lots unless breeding and history is guaranteed.

Any breeder mating his sheep promiscuously will in a very short time find that his flock will have deteriorated into a mediocre one, however good it may originally have been. His only remedy, then, is to make a clean sweep and commence afresh.

Ryeland sheep (the "white-faced" Down) are not generally known in this country, but are proving themselves admirably adapted for present-day requirements, and give excellent results for crossing purposes in connection with the fat-lamb and frozen-mutton industry when it is considered that wool must always remain a dominant requirement.

The Corriedale is every year evolving steadily into a more fixed type, and is already regarded by many flockowners as a distinct breed. It is a good sheep for all-round purposes, suited for either semi-pastoral or agricultural country with a moderately dry climate.

POINTS FOR INTENDING SHEEP-FARMERS: HOW TO COMMENCE AND CONTINUE.

After noting the quality and condition of the soil upon which the sheep are to depasture, and carefully observing its aspect and its natural and climatic conditions, the intending sheep-farmer, to be successful, should decide definitely which breed of sheep will best suit the country, at the same time firmly fixing upon an ideal type, and also should determine never to forget the one essential to success—namely, *don't overstock*. A rule which should also be remembered is to frequently change, where possible, the sheep from one paddock to another. A permanent supply of fresh water is essential. Careful observance of these details will largely prevent parasitic ailments, and ensure a healthy flock with a minimum death-rate. Important as these points are, however, it is on breeding and judicious feeding that the main success of the sheep-farmer must depend. Having sheep suitable to his environment, culling heavily to maintain type and constitution, and managing them to advantage, he will within a few years find himself in possession of a flock to be proud of, and one which will redound both to his own credit and to that of the industry.



SEMI-OFFICIAL TESTING.

GOOD WORK BEING DONE.

W. M. SINGLETON.

THE official testing of purebred Holstein and Jersey cows for their butter-fat production, which was undertaken last spring through the co-operation of the respective breeders' associations and the Dairy-produce Division of the Department, has progressed favourably during the season.

The final figures will bear testimony to the fact that a number of the cows have done very creditable work. Already several have given more than the minimum required for qualification. For mature cows this standard has been placed at 350 lb. of butter-fat, the requirement decreasing by one-tenth of a pound fat for each day the animal is less than five years old at the date of her calving until the age of two years is reached. Figured on this basis, a heifer calving on the day she is two years of age, or less, is required to give 240.5 lb. fat.

Starting as yearlings, four heifers have produced good records. The Jersey heifer Lady of Collingwood, owned by Mr. F. K. Hellver, has produced her butter-fat requirement of 240.5 lb. fat in 140 days. Mr. Donald's Holstein heifer Netherland Princess IV has produced the same requirement in 153 days. The former commenced her test at the age of 1 year 356 days, and the latter at 1 year 353 days. The Weraroa Holstein Jessie Fobes Beets has produced her minimum in 190 days. At calving she was 1 year 356 days old. The Jersey cow Rewa Amaryllis, owned by Mr. W. H. Booth, starting at 1 year 335 days, produced her 240.5 lb. fat in 223 days. Taking into consideration the ages of these animals, this is doubtless good work.

The two-year-old class is fairly strongly represented in Jerseys that have produced the standard, six having already passed the requirement. The record performance for Jerseys is that of Mr. E. Eagle's cow Belvedere Briar, which gave 276.1 lb. fat in 159 days. Although the Holstein two-year-olds are represented by only Mr. W. Remnant's Colantha Pietertje Buttercup, she has the credit for having produced her requirement in the same number of days as Mr. Eagle's Jersey. These records are accompanied in this class



MR. F. K. HELLVER'S JERSEY HEIFER LADY OF COLLINGWOOD.

by those of Mr. A. E. Missen's Dominion Lovely's Gem, having given 269.7 lb. fat in 199 days; Dr. F. J. Watson's Charmer of Bulls, 270.1 lb. fat in 204 days; Mr. W. N. Stephenson's Campanile's Palm, 243.5 lb. fat in 209 days; and Mr. J. D. Healey's Bridal Bouquet, with 274.7 lb. fat in 210 days.

In the three-year-old class Mr. G. Aitchison's Holstein Gladys II holds the distinction of having produced her requirement in the shortest time—viz., 125 days. Indeed, up to the present this cow heads the whole list in this respect. She is, however, closely followed by Mr. R. J. Linn's Jersey cow Belvedere Rose, which qualified in 138 days. Gladys II had to produce 292.5 lb. fat and Belvedere Rose 278.9 lb. to qualify. Thus far these two cows hold first and second places amongst all cows, with regard to having produced their requirement in the smallest number of days. Other Jerseys in this class that have qualified according to production are—Mr. R. J. Linn's Fitzwilliam's Fancy, with 280.5 lb. fat in 168 days; Mr. W. V. Harkness's Zest, with 301.6 lb. fat in 177 days; and Mr. R. J. Linn's Queenie Lass, with 311.2 lb. fat in 195 days.

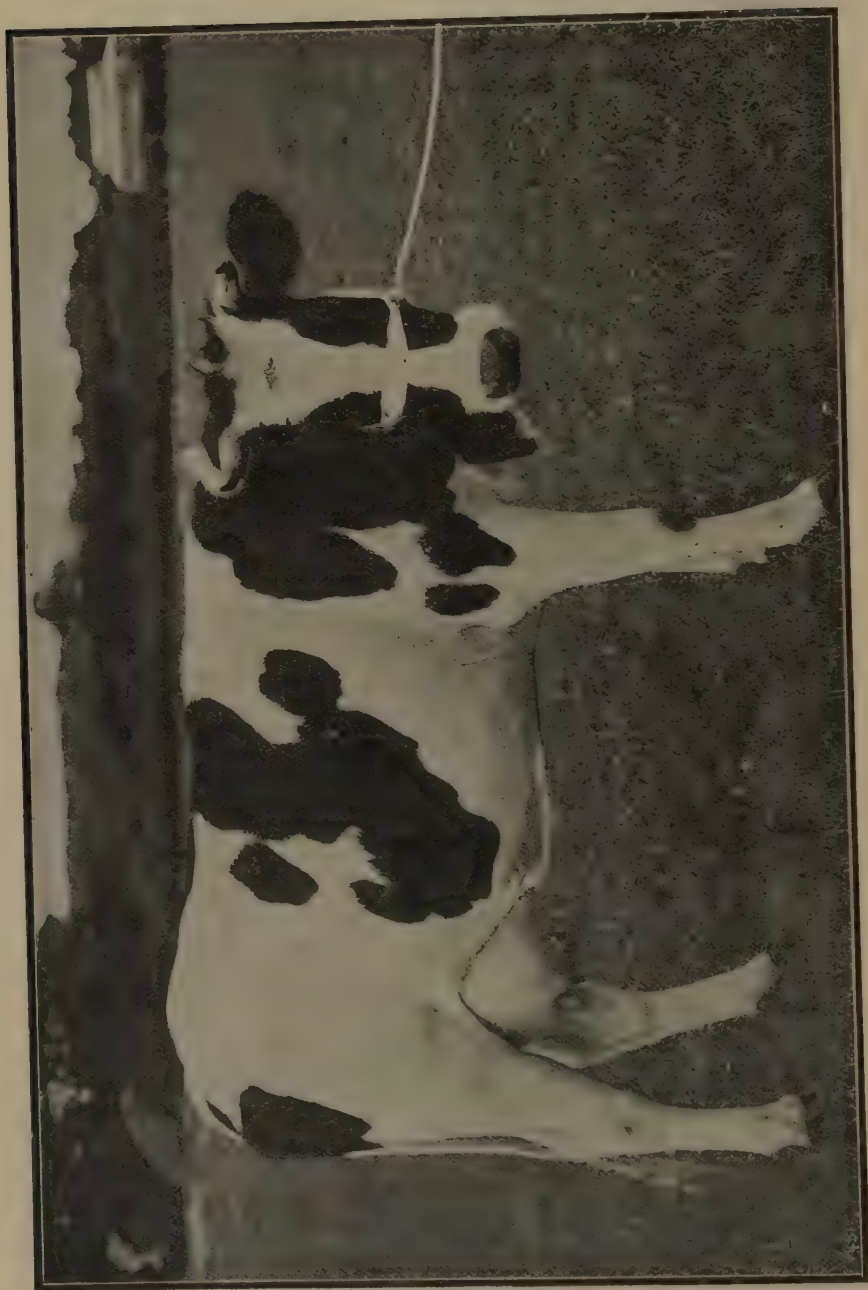
For four-year-olds the only entrant as yet to qualify is the Holstein cow Countess of Galatea, owned by Mr. Newton King, which gave 342.5 lb. fat in 237 days.

In the mature class the Weraroa Holstein cows, Mary and Manola, head the list, having produced the minimum requirement of mature cows (350 lb. fat) in 169 and 173 days respectively. These two are followed by two other Holsteins—Mr. Leith's Gipsy Girl, in 187 days, and Mr. Newton King's Lady Rozine, 196 days. Among the mature Jerseys, Mr. R. J. Linn's Miss Urenui has qualified in 202 days, Mr. C. C. Buckland's Holstein cow Glendowie Emblem qualified in 222 days, and Dr. F. J. Watson's Jersey Silver Maid in 242 days.

The foregoing remarks apply only to those cows and heifers which have, up to the end of March, produced the minimum requirement for their class. All these animals are continuing with the test, and will have good records at the expiry of their year or lactation-period. Other cows which commenced their test at a later date have yet to be heard from, and records quite as creditable may be forthcoming.

Considering that practically all of these cows are milked only twice daily, and that many of them are running with the ordinary herds, these figures are certainly creditable to the breeds and owners represented.

A CLEAN shed, a clean cow, a clean bucket, and clean hands (or machines) mean clean milk.



MR. J. DONALD'S HOLSTEIN HEIFER NETHERLAND PRINCESS IV.

MILK - PRODUCTION.

EFFECT OF CHANGE OF PASTURE AND FEED.

PRIMROSE McCONNELL.

As showing the importance of an entire change of feed and a complete change of pasture to the milking herd the following experiment conducted at the Ruakura Farm of Instruction is of interest.

From the New Year until the 27th March the dairy herd at this station received, in addition to pasture grass, a liberal supply of forage in the form of chou moellier, millet, millet and peas, maize, maize and peas, &c., but, despite this fact, by the latter date the milk-yield had commenced to go down very rapidly. A fine paddock of green barley and tares being then available the herd was moved altogether from the pasture, and was confined to the barley and tares. The crop was really meant for ploughing under, the paddock being naturally a very poor one, but I considered it a good opportunity for carrying out a valuable experiment. Any of the crop the cows may seem to waste will make the best of manure when ploughed under.

Attached is a table giving the results. These results are all the more remarkable seeing that the majority of the cows are nearing the end of their period of lactation. It is recognized by all dairy-men that adverse circumstances will cause a cow to decrease her milk-yield much more quickly than she will increase the yield under the most favourable conditions, particularly towards the end of the milking season. It is now also freely admitted that an increase in the milk-yield often means a decrease in the percentage of butter-fat, yet the attached results show a very decided increase of butter-fat as well as milk-yield. Taking the Shorthorn Jean as an example: This is a two-year-old heifer, and has been milking for nearly eight months, yet she shows an increase on the week of 58.5 lb. of milk and 0.3 per cent. of butter-fat, while the cow Adelaide also shows an increase of 62.4 lb. of milk and the abnormal increase of 1.4 per cent. of butter-fat.

The milk is weighed with every care twice a day, and the tests are semi-official. There can be no mistake in the latter, the increase

over all the cows being too consistent. The weather previous to the cows' removal to the tares and barley was close and hot, but is now much cooler, and this would be a factor influencing the yield of milk and fat to some extent. The crop of tares in question was stocked eight weeks after the date of sowing.

There can be no doubt that a complete change for a dairy herd as well as for sheep is conducive to better results; and if the cow-paddock were divided into small areas, so that the cows would be continually moving on to clean ground, the increased milk-yield would soon compensate for the outlay in extra fencing.

It may be mentioned that for the first day or two the cows did not seem to relish the Cape barley, which was just coming into ear, but they soon settled down to their new conditions. A further benefit will accrue from the resting and cleaning of the cow pastures, which will again form an agreeable change when the barley and tares are consumed.

Name of Cow.	Milk-yield for Week previous to Removal to Tares and Barley.	Test.	Milk-yield for Second Week on Tares and Barley.	Test.
<i>Jerseys.</i>				
	lb.		lb.	
Little Fancy ..	94.7	5.0	109.6	5.4
Wild Briar ..	100.9	5.9	120.1	6.4
Cherry Blossom ..	93.5	5.6	119.7	5.6
May Flower ..	100.9	5.0	135.5	6.0
May Blossom ..	82.6	4.9	94.6	5.2
Ruby's Buttercup ..	127.2	5.6	146.4	6.0
Fury's Princess ..	94.2	5.3	115.6	6.4
Eureka ..	120.3	5.4	136.1	5.6
Glenora ..	93.4	6.0	104.5	6.4
Dominion Hope ..	85.7	5.2	113.5	5.6
Dominion Pride ..	92.5	5.1	117.7	6.0
Coral ..	80.0	5.0	91.7	5.4
Lady Ida ..	124.0	5.0 (1st test)	169.0	..
<i>Shorthorns.</i>				
Adelaide ..	186.8	3.2	249.2	4.6
Daisy ..	100.6	3.8	141.3	4.6
Jean ..	100.2	4.3	158.7	4.6
Miss Cox ..	99.1	4.2	141.8	4.4
Bean ..	218.0	3.2	282.6	3.4

The value of the increase must be reckoned in two directions, as previous to being turned on to the barley and tares the cows had commenced to go down in their milk-yield to the extent of almost 10 lb. weekly. Take the two-year-old Shorthorn heifer Jean as an illustration: Had she been kept on pasture without a change she would, instead of increasing, have gone down to about 80 lb., which when compared with the result of feeding on tares and barley shows an increase in favour of the latter of nearly 8 gallons per week, although she had been milking eight months.

SILAGE.

ITS VALUE BEING APPRECIATED.

W. DIBBLE.

SILAGE has conclusively proved its value in the ration of the dairy cow, and there are not wanting evidences that it will yet come to be regarded as of equal value for all classes of farm stock. In some countries where more intensive feeding of dairy herds is in vogue than is the case in New Zealand silage is coming to be looked upon as the staple fodder, and this not only for winter feeding, but in the summer months. Made from the proper materials it is a complete milk-producing ration, possessing that succulence and bulk demanded by the deep-milking dairy cow. While this is so in other countries it is surely reasonable to suppose that silage will prove equally valuable in New Zealand, especially in view of the increasing need of making better use of our lands. Practical experience in both the North and the South Islands has proved that silage is all that its advocates claim for it. In addition to providing an ideal milk-forming food, it is an effective insurance against adverse conditions, and thereby eliminates from dairy-farming that great element of uncertainty in a country where stall feeding is not practised and where dairy cattle are quite subject to a variable climate, unexpectedly harsh in some winters and too often of a droughty nature in the latter part of the summer—in other words, a climate of occasional extremes, even if the extremes are not so intense as in some less-favoured lands. With these unexpected unfavourable conditions silage is an unexcelled fodder, for if not required at any particular time of the year it can be kept for the period when pastures fail and other food is scarce. Even the contention that it is more costly to secure than special green crops loses its force when the great advantage of silage in being always there waiting for an emergency is considered. However, I contend that the cost of preparation is too often exaggerated. True, under some circumstances it is expensive, but means can generally be found to minimize the cost, especially where the spirit of co-operation prevails in a community and where labour-saving devices are properly utilized.

During the past season I witnessed a demonstration of ensilage-making, where the cost was certainly not more than in haymaking,

except under the unusual circumstances where ideal weather prevails for the desired period without a break. The green material—meadow-grass—was conveyed in sledges to the stack, where it was elevated by means of a simple derrick.

Compared with hay, silage presents several distinct advantages. In the first place, the farmer is quite independent of weather-conditions; then, his labour and time are economized, as there is no delay, whatever the weather; and the material is cut and stacked at once, so that the field is unoccupied for a minimum space of time. Is all this saving of time and land of no advantage?

Such ideal succulent and nutritious materials for silage as maize and peas, oats and tares, or lucerne, are certainly much more desirable for stock-feeding than dry hay, in which little nourishment often remains. Silage, indeed, is now on its trial in this country as a substitute for turnips as a cattle-feed. At certain periods of the year it will certainly prove more suitable for milking-stock than swede turnips, quite apart from its high nutritive value, as there will not be any unpleasant flavour imparted to the milk—a defect in dairying districts where roots are used, a defect which is being emphasized with the extension of cheesemaking.

I would again emphasize the fact that while silage can be made from practically anything grown on the farm, from weeds to lucerne, it should be remembered that the better the original matter the better the resulting silage. Now that it has been proved that lucerne can be grown successfully in this country, and this under extreme conditions of soil and environment, an ideal combination to feed with silage is presented. Good lucerne hay balances the silage, and thereby provides a ration suitable for any period of the year. In the winter and spring the lucerne hay can dominate the silage, and in the drier months of the year the silage can dominate the lucerne. In itself lucerne is an admirable material for silage, although when in its most succulent form, as at the first cutting, it requires to be inter-layered with some dry material, such as oaten straw. In fact, in the spring, when all plants are at their most succulent stage and wet weather often prevails when cutting and stacking are in progress, it is advisable to use some dry matter in order that the temperature of the stack may be quickly raised and the work may thereby proceed without interruption. It may be explained that, when 6 ft. to 8 ft. of material are stacked, no further stacking should take place till the temperature has risen to 130° Fahr. If the material is very succulent and a moist atmosphere prevails it is difficult to secure this desired heat, and the use of a little dry material mixed with the green stuff is the only alternative. If the required temperature, or the necessary heat, is attained at the first layer, no

further dry material need be employed, except with the first cutting of lucerne, when a 6 in. layer of straw is advisable between every 2 ft. layer of the green lucerne.

The experience of the past season in New Zealand has definitely proved that silage is as valuable for stock-feeding, especially for dairy cows, as it is in such countries as America, where its value is properly appreciated. One South Island dairy-farmer writes to this effect: "I am satisfied with the increased production of my milk and cream as a result of ensilage this year. My cows have milked during the past winter equally as well as when feeding on summer pastures; in fact, they usually gain in quality and quantity when fed on first-class silage. Besides the cost of the ration being reduced, there is also a reduction in the cost of producing a given amount of butter-fat."

This is also the invariable experience in America. It is well illustrated in the case of two herds whose records were obtained from one of the co-operative cow-testing associations. These herds were chosen for comparison because the average butter-fat production was more equal than that of any other herds in the association. One herd was fed on silage, and the other was not. The cost of hay and grain and the cost to produce 1 lb. of butter-fat were all lower in the case of the silage-fed cows than with those not so fed. There was $2\frac{1}{2}$ d. difference in the cost of producing 1 lb. of butter-fat between the silage-fed herd and the herd not fed silage. This is a most important item in estimating the returns from a fairly large herd. In another test, where 248 cows, representing eighteen herds, were fed silage, while 125 cows, representing seven herds, were not fed silage—regardless of breed, age, or period of lactation—the silage-fed cows produced on an average 5.9 per cent. more milk and 7.8 per cent. more butter-fat. At one of the agricultural high-school demonstration farms 24,858 lb. of green-fodder maize, converted into silage and fed with a uniform daily allowance of hay and grain, produced 11 per cent. more milk than when the same amount of green-fodder maize was dried and fed with the same daily ration of hay and grain. Also, 24,440 lb. of silage was obtained from 29,800 lb. of green fodder, and was fed with 1,648 lb. of hay and 2,884 lb. of grain; while 7,330 lb. of field-cured fodder maize was obtained from 29,800 lb. of green fodder, and was fed with 1,567 lb. of hay and 2,743 lb. of grain. The silage ration yielded 5 per cent. more milk and 6 per cent. more butter-fat.

In some parts of the Auckland District dairy-farmers at the present time are experiencing great difficulty in maintaining a normal yield from their herds, owing to a severe spell of dry weather. Had they provided silage when feed was abundant—invariably in New Zealand

there are seasons of the year when the farmer has feed going to waste—they would now be independent of the adverse weather-conditions, while they would at the same time be able to maintain their cattle in excellent condition. With silage there is no need for the dairy-farmer to be ever short of feed for his stock. Not only should he have sufficient silage for the immediate season, but he should have a reserve stack always on hand in view of any unexpected failure of pastures or of adverse weather-conditions.

The advantages of silage feeding may be summed up thus: It keeps young stock growing, while it enables the cow to produce milk and butter-fat more economically; it increases the production of milk and butter-fat; more stock can be kept on a given area; and it is the most economical scheme of supplying feed for milch-cows during the summer months. A supply should always be kept on hand, as it is the most valuable asset the farmer can possess.

ESTIMATION OF GRASSES.

E. CLIFTON.

THE Agrostologist of the Union of South Africa has recently published a list of the best winter-pasture plants introduced and thoroughly tested in that country. Of these, New Zealand tall fescue (*Festuca arundinaceae*) takes the first place.

Tall fescue is described as the most hardy of all the introduced grasses. It has proved resistant to both frost and drought. It is found to prefer a heavy clayey soil, and flourishes with a copious rainfall. It thrives remarkably well with irrigation, grows vigorously under varied conditions, and is highly appreciated as a stock-food.

Here is a remarkable illustration of the value of a grass in another part of the world in contradistinction to its estimation in the country from which a large quantity of its seed is obtained and from which it even takes its name.

In South Africa the Agrostologist describes cocksfoot as an excellent pasture grass where conditions favour it, but it is found difficult of establishment as a pasture in that country.

ALL nature is variable; but few things in it are more variable than the soil covering of the globe. The first step, therefore, in successful farming is for the individual farmer to learn as much as possible of the peculiarities of that part of it under his particular care.

SEED - TESTING.

THE DETERMINATION OF PURITY.

A. H. COCKAYNE.

AGRICULTURAL seeds probably vary more in quality, and therefore in value, than any other commodity that the farmer has to buy. At the same time they are, weight for weight, the most expensive of any of his recurring purchases. It is consequently obvious that great care should be exercised in the buying of seeds, both with regard to their fitness for producing a satisfactory crop and to determine which sample shows the best value for the price demanded; or, in other words, which sample is the cheapest to sow. It can be taken as an axiom that seeds offered below their ordinary market value are *always expensive*. The reverse is, unfortunately, not always true with normal and high-priced samples, and thus the determination of their relation of value to cost becomes an important consideration. At the present time New Zealand farmers almost always buy their seeds on a mere superficial examination of the general appearance, and this is in many cases comparatively valueless so far as determining their fitness for agricultural purposes is concerned. It is quite valueless in determining the relation of value to cost. This is especially true of such seeds as those of the grasses, clovers, turnips, and mangels that vary more in quality than any others that the farmer handles. In most cases the price is used to determine the quality rather than, as it should be, the quality determining the price. Again, with high-priced lines, the farmer nearly always relies on the general appearance rather than on a determination of those special qualities that should at least be the real reason for making such seed command a higher figure than lower-priced samples. The only proper method of deciding the fitness of a sample for agricultural purposes and the proper relation of value to cost is by a thorough test of both its purity and germination. The buying of seeds on their general appearance alone instead of with a knowledge of their purity and germination is very nearly equivalent to the purchase of a dairy cow on appearance instead of on her capacity for producing butter-fat.

The Department has now a small but fairly well equipped laboratory for the purposes of seed-testing. Farmers are therefore

now enabled to have agricultural seeds tested free of charge, and with considerably more expedition than has formerly been the case. It is hoped that farmers will take full advantage of the facilities that are now being provided by the Department in this connection. Indeed, the large number of samples being received makes it apparent that the value of this work is being recognized. With regard to the methods adopted by the Department, some of these are at considerable variance with those in use in many of the main seed-testing stations in other countries, and a consideration of the reasons that have led to the rejection of certain of the foreign methods appears necessary.

THE FUNCTIONS OF A SEED-ANALYSIS.

Before discussing the merits and demerits of the system employed by the Department in the testing of agricultural seeds it is well to briefly outline what the proper analysis of any sample should determine.

The functions that should be performed by a proper and exhaustive analysis can be grouped under three headings, namely,—

- (1.) The accurate determination as to whether the sample is a suitable one for sowing.
- (2.) The determination of the relative value of one sample to another.
- (3.) The determination whether the price asked is a fair one, taking the average market price of the highest-grade seed as a guide.

In many cases, especially with regard to those seeds that represent distinct or improved strains, trueness to type is also a very important consideration; but this cannot be determined by an analysis. It necessitates the critical examination of the growing crop from which the seed is to be harvested.

The fitness of any sample for sowing depends primarily on the character and number of the foreign or extraneous seeds that it contains. If these foreign seeds are those of plants that will in any way seriously affect the crop that is to be grown, the sample must be considered quite unfit for the farmer to use. They will not only cause a reduction in the crop, but may also act detrimentally on the productive capacity of the land for many years—indeed, perhaps permanently reduce its value for agricultural purposes. Thus the accurate determination of the amount and kinds of foreign seeds present is essential in any seed-analysis.

The other factor that determines the fitness for sowing is the capacity of growth or germination. Samples that show a very low germination are comparatively valueless. They should always be rejected, as their price rarely compensates for the small percentage of living seed they contain. A low germination, however, need not

always preclude the seed being used, but the presence of dangerous weed-seeds should always condemn a sample, no matter whether the germination is satisfactory or not. A low germination can often be remedied by increasing the amount of seed that is sown, but there is no method of profitably employing a sample that contains dangerous and aggressive weeds. It is thus seen that the ascertaining of germination, although very important, is not the essential feature that determines the fitness of a sample for sowing. The germination, however, does decide the amount of any sample fit for sowing that it is necessary to use in order to secure a satisfactory crop.

The determining of the relative value and the price is in all cases based on the combined considerations of fitness for sowing and germination, or, in other words, on the comparative purity and germination of different samples.

THE COMPOSITION OF A SAMPLE.

Agricultural seeds that are offered for sale are, with the exception of those that are large and quite uniform in size, rarely if ever absolutely pure; and, in general, the composition of a sample may thus comprise,—

(1.) Fully developed seed of the kind of which the sample is said to consist and capable of growing (living seed).

(2.) Fully developed seed of the kind of which the sample is said to consist and incapable of germination (dead seed).

(3.) Immature seed and empty husks of the kind being sold. Some of the immature seed may be capable of germination, but, presumably, they would produce weak inferior plants (chaffy seeds).

(4.) Seeds of plants other than that which the sample is sold for and having some agricultural value (non-injurious foreign seeds).

(5.) Seeds of plants other than that of which the sample is said to consist and having no agricultural value (weed-seeds).

(6.) Fungus-spores, resting bodies, sclerotia, &c.

(7.) Insects, either living (such as mites and weevils) or dead (such as the dried bodies of numerous types).

(8.) Organic materials, such as pieces of leaves, stems, glumes, &c. (organic inert matter).

(9.) Inorganic materials, such as rock and soil particles (inorganic inert matter).

THE INTERPRETATION OF THE TERM "PURITY."

In the analysing of agricultural seeds it is customary to divide the sample into two groups—pure seed and impurities. The purity is obtained by subtracting the percentage of impurities from 100. Thus, a sample having 10 per cent. of impurities is said to be of

90 per cent. purity. In many cases there is no difficulty in determining what portion of the sample should be included among the impurities, but with many seeds, and especially those of the grasses—where many seeds although true to name may be more or less devoid of kernels—there is a wide divergence of opinion as to what interpretation should be given to the term “purity.” In the majority of European seed-control stations all the imperfectly developed seeds, especially in the case of the larger-seeded grasses—such as cocksfoot, rye-grass, and the fescues—although true to name, are included under “impurities.” Again, at a few stations, notably the Irish one, these immature seeds are included under “pure seed.” As in all cases the germination tests are only made from that seed left after all the impurities are removed, it is obvious that the results will be very different in accordance with what meaning has been given to the term “purity.” Take an extreme case. Let us consider a sample of meadow foxtail that has been well cleaned and contains no foreign seeds or inert matter, but of which 30 per cent. of the foxtail-seeds are not properly filled. If we assume that all the filled seeds would germinate, then in the case where all the empty seeds are counted as impurities the germination of the selected seed would be 100 per cent.; but if the empty seeds were counted as pure seed the germination would be 70 per cent. In the seed-testing done by this Department only foreign seeds, spores, &c., and inert matter are looked upon as impurities; and all imperfectly developed seed, provided it is true to name, is counted as pure seed, and is included in the germination tests. Here are the main reasons for adopting this interpretation of “purity” instead of the ordinary European conception of the term:—

(1.) When only the fully developed selected seed is used for the germination tests a misleading idea as to the value of the seed is conveyed to the buyer, unless special stress is laid on the amount of chaffy seed that is included in the percentage of impurities. Where the germination of the selected seed of a well-cleaned inferior line is high the seller would be induced to quote the germination test only, and the farmer, seeing that the sample was free from any real impurities such as foreign seeds, would be entirely misled as to the value of the sample.

(2.) In the case of high-grade lines containing little (if any) chaffy seed, there would be no difference in the germination of the seed if either of the above meanings of purity were applied to the sample.

(3.) The complete separation of all the chaffy seeds is an exceedingly difficult matter, and depends largely upon the opinion and skill of the seed-analyst, and in all seed-testing the influence of the personality of the tester should be reduced to a minimum.

THE CALCULATION OF FOREIGN SEEDS BY NUMBERS.

All seed-control stations calculate the percentage of impurities by weight, no matter what interpretation is given to the term "purity." This is not wholly satisfactory, as the germination percentage is always calculated by numbers. The ideal way, of course, would be to reckon both percentages in the same terms; but, so far as germination is concerned, no method has been, or is, likely to be, devised to ascertain it by weight. Again, with regard to the foreign seeds present in a sample, their weight often gives no proper indication of their relative abundance. It frequently occurs that these are slightly smaller and weigh less individually than the average-sized seeds of the kind being sold, and therefore when the percentage by numbers is taken it is found to be greater than the percentage by weight. It has been shown that the essential feature in the determination of purity is the number and character of the foreign seeds, and that this determination clearly indicates whether the sample is a suitable one for sowing. The Department therefore calculates the foreign seeds by numbers, and not by weight. Thus, a sample containing three foreign seeds per hundred is said to be of 97 per cent. purity. It will be at once said that the weakness of this system is that the inert matter, which is also an impurity, is not taken into consideration. This weakness is, however, in the majority of cases of comparatively minor importance.

THE CALCULATION OF INERT MATTER NOT ESSENTIAL.

In the first place, in all machine-dressed samples the percentage by weight of the inert material is inappreciable, and if it does occur in excessive quantities it is a certain indication that the cleaning has been faulty. Again, the inert matter does not in any way depreciate the value of the pure seed for sowing, nor has it any prejudicial effect on the resultant crop. The presence of inert matter certainly reduces the price that should be paid, but only exactly by that percentage in which it occurs in a sample. Thus, in two samples of equal germination and freedom from objectionable foreign seeds, in which one contains 2 per cent. more inert matter than the other, the difference in price should be 2 per cent.; and as the percentage of inert matter—at any rate, in New Zealand machine-dressed seed—rarely exceeds that figure, it need in practice hardly be taken into consideration. Whenever a sample contains a large amount of such material a special note is made of the fact, and mention is made in the report submitted to the sender. With regard to fungus-spores, living insects, &c., their presence is also always indicated, and if they are likely to prove of detriment they are especially emphasized.

“ REAL VALUE.”

In all European seed-testing great stress is often laid on the necessity for ascertaining what is commonly termed the “real value” of a sample. By “real value” is meant the percentage of pure and properly developed seed capable of germination. This is determined by multiplying the percentage of purity by the percentage of germination and dividing by 100; thus,
$$\frac{\text{Percentage purity} \times \text{percentage germination}}{100}$$

= real value. In order that the determination of real value should be in any way correct it is essential that no empty seeds should be included in the germination tests, as improperly developed seeds would cause a considerable error. This is due to the fact that seeds devoid, or more or less devoid, of kernels weigh individually less than properly matured ones; and, as purity is calculated by weight and germination by number, the presence of any chaffy seeds in the germination tests will seriously affect the correct “real value.” In fact, in order that the real value should be absolutely correct it would be necessary for the seeds that did not germinate to be of equal weight individually to those that sprouted. When it is considered that no sharp line of demarcation exists between fully and imperfectly developed grass-seeds, but that the one kind merge gradually into the other, the great difficulty of determining the real value with any degree of accuracy can be appreciated. That this difficulty is one that is almost impossible to overcome is suggested by the fact that all seed-control stations allow a considerable margin of error—generally set down at 5 per cent.—in making this calculation.

In all cases where the impurities do not include all the light and chaffy seeds, and are calculated by weight, the real value cannot be in any way correctly determined, owing to the great variation in weight of the seeds used in the germination tests and to the living ones being calculated by numbers. It is entirely due to this that the European definition of “impurity” is made to include all those seeds which although correct in name may be more or less devoid of kernels.

The ascertaining of real value by weight is of great assistance to seed-merchants in making their bulk purchases, as it enables any differences that may occur in sale and delivery samples being accurately adjusted between buyer and seller, and that without the arbitration by individual opinion as to the difference in value that may exist. But so far as the farmer is concerned, and especially the New Zealand farmer, real value is not the essential feature of seed-testing that the European school of seed-analysts would lead one to suppose. In the first place, it is quite likely to be incorrect unless the greatest care is taken in separating out the chaffy seeds,

a matter which has been shown to depend very largely on the personal ability of the seed-analyst. Secondly, it gives no indication of the relative value of samples so far as the presence of foreign seeds and their amount by numbers is concerned. Theoretically, a sample with a real value of 90 per cent.—*i.e.*, one containing 90 lb. of pure living seed per 100 lb.—is much more valuable than one of 80 per cent. real value—*i.e.*, one containing 80 lb. of pure living seed per 100 lb. In practice, however, the sample of lower value may be far preferable to sow, as the higher-valued one might contain a far greater number of objectionable foreign seeds, and in such a case the lower-valued one would be immeasurably the better sample for the farmer to employ. Again, as the foreign seeds are calculated by weight, the percentage by number might easily be much greater if the weed-seeds are individually lighter than the seed that is being sold.

With our method of calculating the foreign seeds by percentage in numbers a comparatively true "real value," based on numbers, can always be obtained with those samples that do not contain an appreciable percentage of inert matter. Thus, for example, a rye-grass sample might have ten foreign seeds per hundred, and a germination of 90 per cent. If the purity is multiplied by the germination and divided by 100 the real value by numbers is 81 per cent., which means that in every hundred seeds of the sample there are eighty-one rye-grass seeds capable of germination. As the weight of a thousand mixed seeds is also always determined, it is easy to calculate the number of seeds per pound, and by using the real value by numbers the farmer can tell accurately the number of living seeds per pound of the variety which he wishes to sow. It is, however, probable that real value calculated on numbers may in certain cases be misleading. This will occur in those instances where the germination and purity are more or less identical, but the number of seeds per pound varies considerably. Thus, take the case of two rye-grass samples of equal real value per hundred seeds, but where one sample has, say, 200,000 living seeds per pound and the other 250,000 living seeds per pound—the real value being the same—the difference in the number of living seeds per pound is due to the individual seeds of one sample being heavier than those of the other; and, as heavy seeds invariably produce more vigorous plants than light ones, the heavier-seeded line is the more preferable to sow. In the majority of cases investigated, however, the better samples have generally more seeds per pound capable of growing than have the inferior ones.

Real value calculated on numbers has the great advantage of showing accurately the amount of seed that is necessary to sow to an

acre in order to secure a satisfactory crop. The calculation of the amount to sow based on weight, and not on numbers, is no more scientifically sound than would be the planting of an orchard by weight instead of by certain definite numbers. The only error that occurs in our method of calculating real value by numbers lies in the fact that it does not take into consideration the inorganic impurities, but these are rarely of sufficient moment in properly machine-dressed seed to in any way seriously prejudice the result. It can also be claimed that no undressed seed should really be used by a farmer, and that, so far as he is concerned, the Department looks with disfavour on the testing of undressed samples. Of course, with regard to the merchant dealing with seed in the rough, and wishing to know what loss will occur in bringing the seed up to a certain purity, germination, and weight, the European system for the determination of purity and germination has to be adopted; but these are cases which do not affect in any way the system that is being adopted for the testing of seed that is offered to the farmer for sale. Where a sample contains a good deal of inert matter in addition to foreign seeds, as is the case with the bent grasses and danthonia, it is often necessary to weigh this material separately, and when this occurs the real value by numbers cannot be given. In all cases, however, foreign seeds are calculated by numbers, and not by weight, as it is considered that, so far as purity is concerned, the essential feature to determine accurately is the kinds and actual number of the foreign seeds that are contained in a sample. The presence of inert matter, although it should lessen the price that is asked for any seed, does not prejudicially affect the seed after it is sown; and its determination, especially when not present in large quantities, is not of particular moment so far as the fitness of the sample for agricultural purposes is concerned.

“In Auckland there are 230 schools giving agricultural instruction (out of 594 schools and 108 part-time schools), and as this work was proving so satisfactory it had been decided to appoint another instructor.” So said the Chairman of the Education Board (Mr. G. J. Garland) at the opening of the new Te Papapa School last week.—*New Zealand Graphic*.

No industry is so vital to the well-being of a nation as agriculture, and nothing is so vital to agriculture as the soil. How to use and not abuse the soil is the most important problem which faces the farmer of to-day—one worthy of the best efforts of our most profound and learned scientists, for upon its solution depends the future prosperity of the nation.—*Scientific American*.

LINSEED.

MOUMAHAKI EXPERIENCE.

T. W. LONSDALE.

THE leading oil-bearing plant grown in the Dominion is flax, the seed of which is known as linseed. The area devoted to its cultivation is very limited, though, considering the uses to which it may be put, the growing of flax-seed on somewhat extended lines might profitably be undertaken. Well-matured linseed does not contain starch, but the oil-content is of high commercial value.

Ground linseed used in conjunction with separated milk for calf-feeding probably surpasses all other substitutes. Used in reasonable quantities it is quite equal in value to many proprietary mixtures.

It is claimed that linseed possesses a cathartic principle, and should therefore be fed in limited quantities. Calves may safely be fed $\frac{1}{2}$ lb. of linseed per day with separated milk, and this amount will supply oil to take the place of the butter-fat extracted in the process of separation. In countries where it is customary to stall feed cattle the allowance of linseed per head per day amounts in some instances to 8 lb. Linseed may be used in many ways in this country. Fed judiciously in limited quantities to horses and cattle it is invaluable.

Heavy rich land is best adapted to the growing of linseed, though the crop can be successfully cultivated on light soils.

It has been customary at the Moumahaki Experimental Farm during the past two years to grow sufficient linseed to supply home requirements. This season $1\frac{1}{4}$ acres has been grown.

The land on which the crop was produced previously carried a crop of mangels, which was eaten on the field, after which the land was ploughed, harrowed, and sown in linseed on the 26th September, 1912. The seeding was at the rate of 1 bushel per acre, and the manure—3 cwt. of superphosphate and $\frac{1}{2}$ cwt. of sulphate of potash—was applied when drilling the seed. The crop was harvested on the 12th February, 1913, four months and a half from the time of seeding. The yield was 32 bushels per acre, probably a record crop. The English average crop is from 16 to 20 bushels.

The total cost of preparation of the land, seed, manure, harvesting, threshing, and cleaning the seed fit for commercial purposes was £4 2s. per acre, and the gross returns were £25 12s. per acre. After deducting cost of seed, manure, labour, and allowing for rent at the rate of £2 per acre per annum, the net return was £20 10s. per acre.

INOCULATED SOIL.

ITS EFFICACY WHEN TAKEN FROM YEAR-OLD LUCERNE PLOT.

PRIMROSE MCCONNELL.

THIS experiment was carried out on a small plot of lucerne sown on the face of the Big Hill paddock at Ruakura Farm of Instruction in November last. The plot was divided into three equal portions—a non-inoculated plot, a plot inoculated with one-year-old soil, and another with a soil in which lucerne had been growing for three years. For some time there was no apparent difference in the three plots, but at the date of writing (6th April) the non-inoculated plot, in comparison with the inoculated plots, is showing a decided yellowness in colour, while both inoculated plots look exceedingly healthy, being of a bright dark green, the plot inoculated with one-year-old soil being quite as healthy as that inoculated with three-year-old soil. The result is of considerable importance, as up to the present there was a great deal of uncertainty on this matter. I may say that the non-inoculated plot occupied the centre position, so that there could be no possibility of contact between the two inoculated plots. Judging from other similar experiments, however, it would seem as if the bacteria were almost non-motile. I may also mention that the lucerne plot in question is growing on pure red clay, and received a liberal dressing of carbonate of lime, followed by a liberal dressing of equal parts of Seychelles Island guano and basic slag. The splendid results from such land are extremely encouraging.

Farmers intending to sow lucerne on similar soil would do well to sow a small plot only in the first instance, applying double the quantity of inoculated soil. At the end of twelve months they would have sufficient soil to inoculate the whole farm, if required.

Agriculture and the practice of farming have passed through the stage of mystery to that of a trade, with professional aspects. Modern scientific agriculture aims to replace tradition with well-established facts. While the art varies with the individual who practises, it is now based on knowledge—i.e., on experience viewed in the light of science. This is its essential characteristic, and the ability to call science into the service of agriculture is a modern accomplishment.—*U.S.A. Experiment Station Record.*

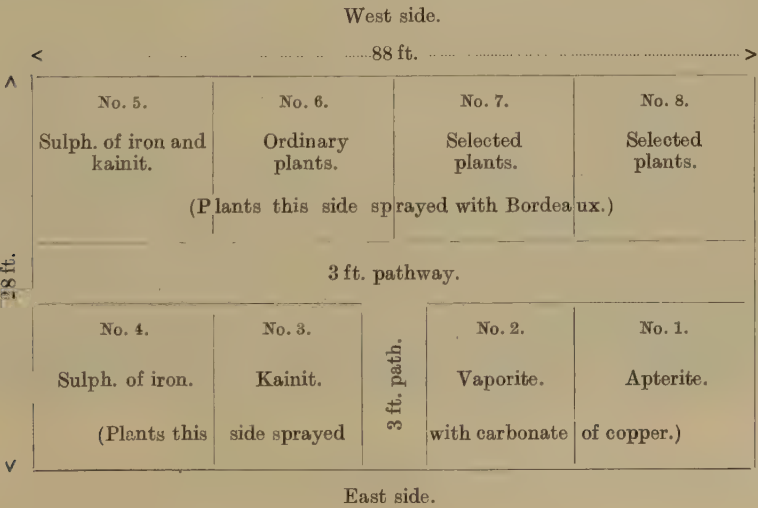
THE TOMATO.

CULTIVATION AND DISEASE-CONTROL EXPERIMENTS.

IN the March *Journal* an account was given of experimental work undertaken in Christchurch in connection with cultural methods and disease-control work in tomato-houses. The experiments at Mr. Odering's house have now been completed. Following is Mr. E. A. Reid's report :—

Mr. Odering's tomato-house, referred to in my report published in the March issue of the *Journal*, has dimensions of 88 ft. by 28 ft., inside measurement. The walls are built of brick to a height of 3 ft. ; a ventilator 4 ft. square is situated at each end of the house. The top ventilators are about 7 ft. long by 2 ft. in width, five being situated on the west and six on the east sides of the house. Bottom ventilators, 4 ft. by 1 ft., are built into the brick walls at intervals of 4 ft.

The entrance-door is in the centre of the east side. For experimental purposes the house was divided into eight plots, four being on each side of a path 3 ft. wide, running the full length of the house. From the path a 3 ft. pathway to the entrance-door was also reserved. This gave sections 1, 4, 5, 6, 7, and 8 275 square feet, and sections 2 and 3 about 256 square feet. The following ground-plan will convey an idea as to situation, &c., of the various plots.





VIEW OF HOUSE, LOOKING NORTH.

Showing apterite and vaporite sections on right, and selected plants on left.



VIEW OF HOUSE, LOOKING SOUTH.

Kainit section and sulphate-of-iron section on left, and kainit with sulphate-of-iron section on right.

THE EXPERIMENTS.

The experiments were for the control of eelworm and fungus diseases. Tests regarding humidity and fertilization, and tests with selected plants for resistance to disease, were also carried out. Tomatoes had been grown in the house, in the same soil, for four seasons, and the soil was badly infested with eelworm, as a glance at photograph No. 9 will show.

OPERATIONS.

Operations were commenced on the 29th July, 1912. Section No. 1 was treated with 56 lb. of apterite. Section No. 2 was treated with 46 lb. of vaporite. These soil-fumigants were lightly dug in. Section No. 3 received a dressing of 2 oz. of kainit per square yard; section No. 4 received a dressing of 2 oz. of sulph. of iron per square yard; section No. 5 received a dressing of 1 oz. of kainit and 1 oz. sulph. of iron per square yard. All these dressings were lightly worked into the soil. Sections 6, 7, and 8 received no treatment, being reserved for a test of selected plants, and simply dug over.

On the 2nd September, 1912, the house was disinfected with 2½-per-cent. solution of formalin, applied as described in the experiments carried out in Mr. Maffey's house (see *Journal of Agriculture*, 1st March. 1913.)

Sections 1 and 2 were planted on the 9th September, 1912, there being a distance of 2½ ft. between the rows and 1 ft. between the plants. On the 16th September, 1912, sections 3 and 4 were planted, and on the 23rd September, 1912, sections 5, 6, 7, and 8. The plants for sections 7 and 8 were raised by Mr. Maffey from the same seed as Mr. Odering's plants. All plants were propagated and grown in sterilized soil, and, with the exception of section 6, all the plants were sturdy and well grown. The plants in section 6 were of the ordinary type, but were weaker in constitution than the plants in other sections.

On the 10th October the plants had hardened sufficiently for the first spraying with the Bordeaux mixture, which was applied at a strength of 3 lb. sulph. copper, 5 lb. lime, to 50 gallons of water.

On the 15th October, 1912, all sections received a dressing of 1 oz. superphosphate and ¾ oz. bonedust per square yard. This was lightly raked into the soil.

On the 31st October, 1912, the plants were sprayed with Bordeaux of the same strength as formerly.

On the 18th November, 1912, all sections were again dressed with fertilizers, in the same proportions as the former application, and lightly raked in.

On the 28th November, 1912, the plants were sprayed with Bordeaux, and on the 24th December, 1912, the plants on the east side were sprayed with the ammoniacal carbonate-of-copper solution. The plants



SECTIONS 6 AND 7.

Showing difference in growth between sturdy plants (on right) and drawn-up, weakly plants (on left).

on the latter side of the house were then reserved for testing this solution, while the Bordeaux mixture was continued on the west side. The plants on the west side received in all nine sprayings of Bordeaux mixture at intervals of about fourteen days; while the east side received three sprayings of Bordeaux previous to the 24th December, 1912, and six sprayings with the carbonate of copper, also at intervals of about fourteen days. No other manures or sprays were used throughout the experiments until the 21st February, 1913, when the plants on the east side were dressed with superphosphates, at the rate of 2 oz. per square yard.

PLANTS.

The plants for sections 1 to 6 were propagated by Mr. Odering from seed supplied by Mr. Maffey, while from the same lot of seed Mr. Maffey raised the plants for sections 7 and 8. The propagating-soil was sterilized by heating to 210 deg. At the time of setting out, the plants in sections 1, 2, 7, and 8 were sturdy, and rather stronger than those in sections 3, 4, and 5, while the plants in section 6 were the weakest, being slightly drawn up, and not so well hardened off as the plants in other sections. Owing to the soil in this house being rather damp and cold, the plants were late in being set out in the permanent rows, and it was not until the 23rd September, 1912, that this work was completed. Many of the plants in section 6 "damped off," and were replaced by other plants, and, later on, some plants received a severe check by eelworm, and were again replaced. When the plants had grown sufficiently for training, pegs were driven in at the end of each row, and a light wire was fastened from this peg to the wall, about 3 in. or 4 in. above the surface of the soil, the twine for training each plant being fastened to this wire close to the base of the stem. This gives the plants more stability, and when spraying or working amongst them saves them from being knocked about. I certainly think this method an improvement on the system of fastening the twine to the plant. Of course it involves more work, but the necessary free movement when working amongst plants is made easier if the plants are securely tied. Many growers, I understand, adopted this method some time ago. With this exception the plants were pruned and trained as recommended by Mr. S. F. Anderson in the *Journal of Agriculture*, page 118, August, 1911.

SPRAYING.

It will be noticed that Bordeaux mixture, strength 3 lb. of sulph. of copper, 5 lb. of roche lime, and 50 gallons water, which was used no less than nine times, again proved successful in controlling fungoid diseases, including "spot" (*Cladosporium fulvum*). I may state that this solution was always tested with blue litmus paper before applying.



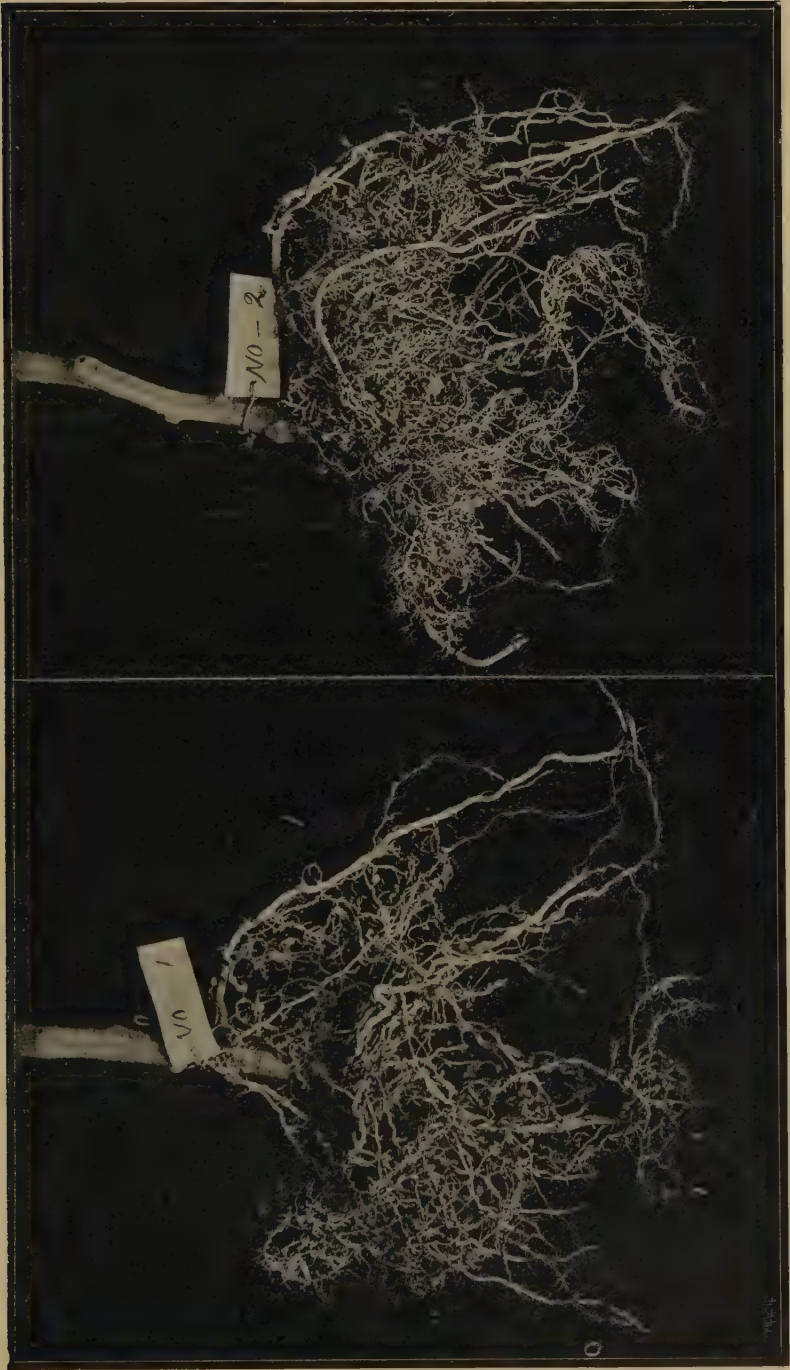
EELWORM.—ROOT-SYSTEM OF TOMATO-PLANT, FROM PLOT NO. 4.

and on one occasion no less than 8 lb. of lime, instead of the usual quantity—viz., 5 lb.—was used before the Bordeaux solution stood the test, the lime proving of inferior quality. This shows it is always advisable to test this mixture before applying, or the results might be disastrous through no apparent cause. Litmus paper can be procured from any chemist. A packet costs 4d., and contains twenty papers, so the test is very inexpensive. I omitted to mention that in Mr. Maffey's experiments a solution of ferro-cyanide was used. It is a more delicate test than the litmus paper, but, being a deadly poison, it would be dangerous to have on hand unless carefully guarded, especially where children are concerned, so I prefer to recommend the litmus paper.

After the application of the Bordeaux mixture no injurious effects to foliage or fertilization were noticed. The objection to the Bordeaux is the amount of sediment left on the fruit after spraying, necessitating washing or wiping before sale. This entails much extra work. To obviate this, if possible, the plants on the east side of the house received only three sprayings with Bordeaux. The ammoniacal carbonate of copper was then used. This solution can be purchased ready prepared at 12s. 6d. per gallon jar. The proportions recommended by the Department for this experiment are 1 pint of the solution to 15 of water. This solution was successful in controlling fungoid diseases especially "spot" (*Cladosporium fulvum*). It leaves no sediment on foliage or fruit. It is evident, however, that further tests will have to be carried out, as towards the end of the season the repeated sprayings every fourteen days seemed to cause the leaves to turn a yellow colour, although the injury did not affect the crop, as all trusses of fruit had well set before the injury became noticeable. A comparison between the yield of crop on the east and west sides, and also a glance at the photographs, will show the condition of plants, and bear out the above statement. Specimens of affected plants were forwarded to the Government Biologist, Mr. Cockayne, for examination. He reports as follows: "The yellow colouring of the leaves of the tomatoes submitted, under cover of your memorandum of the 26th ultimo, is not due to any specific organism, but is apparently entirely caused through spray injury. The conditions under which carbonate of copper is injurious are not properly known." This being the case, it would not be advisable to recommend this spray until further experiments and tests have been carried out. I understand this work will be continued by the Department at the Hutt. The results of the experiments will, I am sure, be awaited with interest.

MULCHING.

No stable manure or mulching of any description were used in the house. A light raking of the surface soil prevented caking. This house was mainly used for conducting experiments with remedies for



EELWORM.—ROOT-SYSTEMS OF PLANTS, FROM PLOTS 1 (LEFT) AND 2 (RIGHT).

the control of eelworm. To enable these remedies to have an equal chance, all the sections received the same fertilizers and the same proportions per square yard. All sections were infested with eelworm, and, in spite of this pest being a continual drain on the flow of sap, the plants grew and bore fruit much better than was anticipated; in fact, some of the visiting growers expressed surprise at the growth and fruitfulness of the plants, especially when so badly infected with eelworm. The photographs of the roots will give an idea of the degree of infection. Again, it must be remembered that this was the fourth crop of tomatoes grown in the same soil. Under these handicaps the dressing of fertilizers given proved ample, hence it is evident that the proportions per square yard of manures required for tomato-houses recommended by the Department are fairly correct.

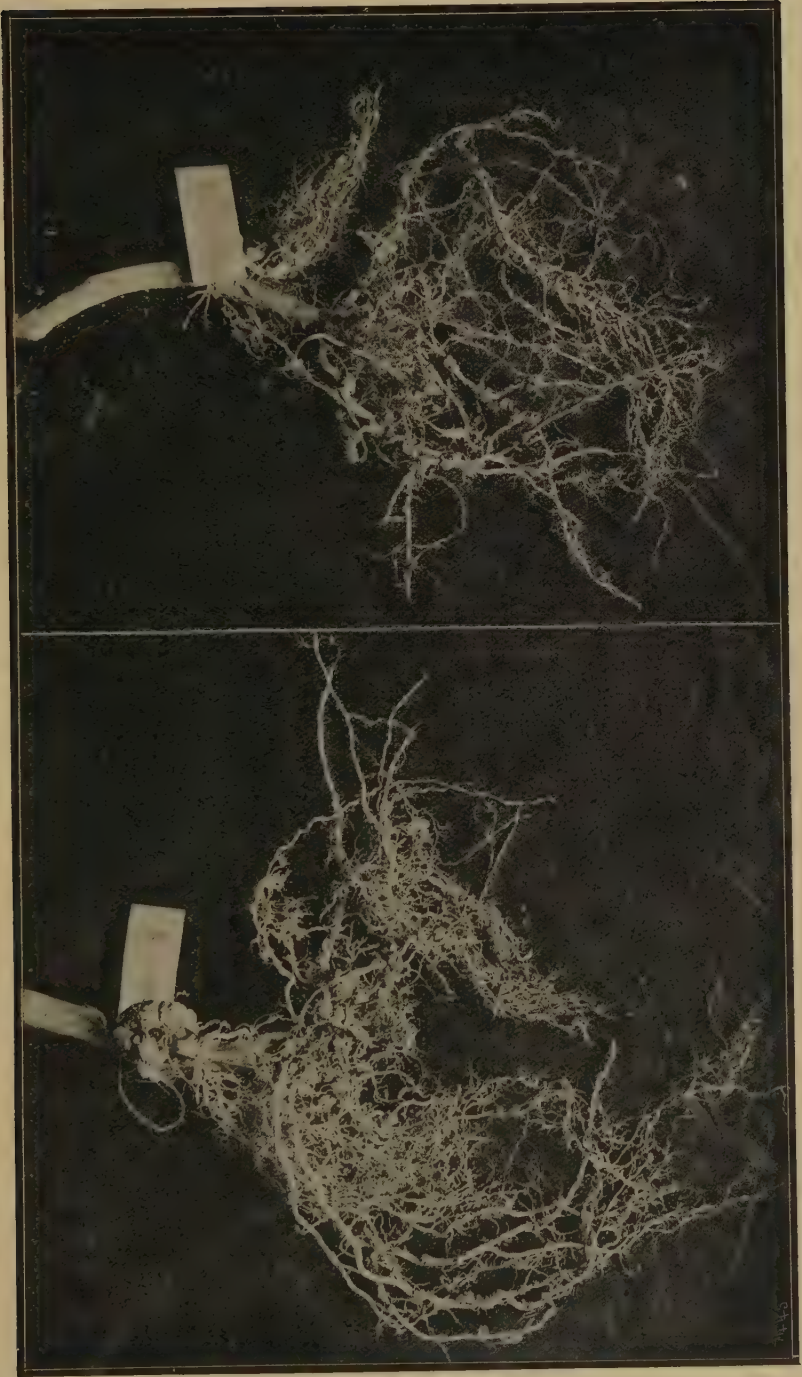
I omitted to mention that late in the season the east side received a dressing of 2 oz. of superphosphate per square yard. This was applied when the plants appeared to be of a sickly yellow colour, the idea being to try to stimulate them. The dressing was, however, of little consequence, as it was late in the season before the damage by carbonate-of-copper spray became noticeable, and the dressing had but little effect.

WATERING AND HUMIDITY.

A Lloyd's hygrodeik was used to test the humidity, the reading being taken daily from the 28th November, 1912, to the 6th March, 1913. It ranged from 42·7 to 74·1, and averaged for the season 67·5, slightly lower than in Mr. Maffey's house. Mr. Odering watered the plants in the evening, as a rule after 5 p.m., and with few exceptions fertilization was never interfered with by too high a humidity. On these occasions Mr. Odering watered earlier in the day. This raised the humidity above 70 deg., and, as in Mr. Maffey's house, the pollen was useless for fertilization when the humidity was above 70 deg., thus bearing out the contention that it is advisable to water during summer weather not earlier in the day than 3 p.m. There is no doubt but that the watering of house-grown tomato-plants early in the day, coupled with overmanuring, is to a very great extent accountable for the fruit failing to set, and the poor crops which consequently result. I would suggest that growers should purchase a hygrodeik and test this question for themselves. It is a matter of great importance.

TEMPERATURE.

The maximum temperature, taken daily at 1.30 p.m., from the 28th November, 1912, to the 6th March, 1913, ranged from 53 deg. to 90 deg., averaging 74·1 deg. for the season. The minimum temperature for the same period ranged from 34 deg. to 55 deg., averaging 42·7 deg. for the season. The maximum temperature, 74·1 deg., is a safe one



EELWORM.—ROOT-SYSTEMS OF PLANTS, FROM PLOTS 3 (LEFT) AND 5 (RIGHT).

for tomato-houses, but the minimum, 42.7 deg., is rather low. At times it was much too low, especially when the reading was 34 deg., but this occurred at the latter end of the season; in fact, it was the reading for the last two weeks which lowered the minimum average. For the earlier part of the season the reading was never lower than 40 deg. The average minimum temperature of 50 deg. in Mr. Maffey's house was more satisfactory, and was well above danger-point. It must, however, be remembered that Mr. Odering's house, owing to its situation, is much colder than Mr. Maffey's.

EELWORM.

Eelworm (*Heterodera radicola*) is necessarily a dreaded enemy of tomato-growers. Many are the questions asked by growers of the Department as to some satisfactory means of control. Soil-sterilizing has been tried by a few growers. Others apply a solution of carbolic acid, and "rest" the soil for a season, in the interval growing cucumbers in troughs, the next season reverting to tomatoes. Some growers have laid down concrete floors, bring in fresh soil, and clear both plants and soil out at end of the season, again renewing the soil to a depth of 5 in. to 6 in. This latter method requires a reserve of fresh soil to draw upon, and also means extra labour, but it is satisfactory in controlling eelworm; moreover, it pays the grower for his extra trouble. Many growers, however, have not the necessary reserve of soil **for this treatment**, and sterilizing soil with the appliances at present available is too costly—too expensive in fact for tomato-culture when handling soil in large quantities. To sterilize small lots for propagating-boxes is simple enough, but to prepare several tons is a very different matter. With regard to dressing the soil with carbolic, and growing cucumbers in troughs, I should recommend growers to carefully read Bulletin No. 20, on eelworms, by Messrs. T. W. Kirk, F.L.S., and A. H. Cockayne, Government Biologist, especially page 4, paragraph relating to life-history, and also page 5.

What is required is a remedy by which old soil can be satisfactorily treated and freed from eelworm at little cost. A remedy of this description would revolutionize tomato-culture under glass. Mr. Odering's house was excellent for experimenting with remedies for control of eelworm. The house, as before stated, was divided into sections or plots. No. 1 was treated with 56 lb. apterite; No. 2 with 46 lb. vaporite; No. 3 with 2 oz. kainit per square yard; No. 4 with 2 oz. sulph. of iron per square yard; No. 5 with 1 oz. sulph. of iron and 2 oz. kainit per square yard. All dressings were lightly dug in. Nos. 6, 7, and 8 were reserved for testing of plants, the soil receiving no treatment.

The photographs of the roots of plants taken from each section will, I feel sure, illustrate the effect of the remedies, while a further com-

parison of the crops harvested from each section will enable readers to form their own conclusions without further comment on my part. The photographed roots are typical of the general condition of the plants throughout the sections in which they were grown.

Regarding plant-selection, a glance at the photographs showing a comparison between the plants usually raised commercially and the selected and carefully propagated plants will illustrate such a marked difference that I feel sure growers will study this matter more comprehensively. A comparison of the yields from these sections is also worth noting. This will serve to further bear out the remarks made on plant-propagation in report on experiments in Mr. Maffey's house.

SEED-SELECTION.

I should like to add a few more remarks to a paragraph under heading of "Plant-propagating" contained in my report on experiments in Mr. Maffey's house. It will be noticed that in these experiments all plants for both houses were raised from the same lot of seed, the variety being Clarke's Favourite. Now, I selected nearly thirty distinct types of fruit from the plants grown from this seed, thus plainly indicating that the type of Clarke's Favourite in this strain of seed was faulty, and required more careful selection and building up. To carry this out brings us back to cross-fertilization. This is a subject requiring detailed description, and space will not permit of any further remarks in this paper.

CROP.

The following is a statement of the yield of tomatoes from the different sections :—

No. 1 ..	527 lb.	..	Apterite	..	..	} Sprayed with ammoniacal carbonate of copper.
No. 2 ..	345 „	..	Vaporite	..	..	
No. 3 ..	268 „	..	Kainit	..	..	
No. 4 ..	277 „	..	Sulph. of iron	..	..	
1,417 lb.						

No. 5	..	403 lb.	..	Sulph. of iron and kainit	..	} Sprayed with Bordeaux mixture.
No. 6	..	298 „	..	No treatment, ordinary plants		
No. 7	..	367 „	..	„ selected plants		
No. 8	..	445 „	..	„ „		
				1,513 lb.		

Thanks are due to Mr. Odering for his hearty co-operation and attention to instructions; also to Mr. W. W. Day for his assistance in carrying out the work connected with the experiments.

CONCLUSION.

In conclusion, I should suggest that growers give—(1) More attention to seed-selection; (2) aim at propagating sturdy short-jointed plants; (3) be sparing with manures; (4) when watering, keep humidity as low as possible, in order to aid fertilization; (5) keep the house clean and free from decaying rubbish; (6) when spraying, *spray*, and spray thoroughly, especially the *under-sides* of the leaves, and *always* test the Bordeaux solution before applying.

ORCHARD INSTRUCTORS.

DISTRICTS IN WHICH THEY ARE LOCATED.

FOLLOWING is a list of the names and addresses of the various Orchard Instructors attached to the Department of Agriculture, Industries, and Commerce, together with their respective districts of inspection. These officers give advice gratis to orchardists and intending fruitgrowers on fruitgrowing and gardening generally, fruit-packing, pruning, and spraying for the control of fungus diseases and insect pests, &c.

NORTH ISLAND.

J. W. Collard.—Headquarters, Whangarei. Counties: Otamatea, Hobson, Whangarei, Bay of Islands, Hokianga, Whangaroa, Mongonui.

W. C. Thompson.—Headquarters, Auckland. Counties: Waitemata, Rodney, and part of Eden.

W. R. L. Williams.—Headquarters, Auckland. Counties: Cook, Waikohu, Waipapua, and part of Eden County, Auckland City and Suburbs.

N. R. Pierce.—Headquarters, Auckland. Counties: Manukau, Coromandel, Raglan, Kawhia, Thames, Ohinemuri.

T. E. Rodda.—Headquarters, Hamilton. Counties: Waikato, Waipa, Piako, Tauranga, Matamata, Waikato, West Taupo, East Taupo, Whakatane, Opotiki, Rotorua.

J. A. Campbell.—Headquarters, Hastings. Counties: Wairoa, Hawke's Bay, Waipawa, Waipukurau, Patangata, Dannevirke, Weber.

W. C. Hyde.—Headquarters, Wanganui. Counties: Awakino, Clifton, Ohuru, Taranaki, Egmont, Stratford, Whanganuomona, Eltham, Waimate West, Hawera, Patea, Waitotara, Wanganui, Rangitikei, Waimarino.

G. Stratford.—Headquarters, Palmerston North. Counties: Kiwitea, Oroua, Pohangina, Kairanga, Manawatu, Horowhenua, Woodville, Pahiatua, Akitio, Castlepoint, Masterton, Mauriceville, Eketahuna, Wairarapa South, and Featherston.

T. C. Webb.—Headquarters, Wellington. Counties: Hutt and Makara.

SOUTH ISLAND.

J. H. Thorp.—Headquarters, Nelson. Counties: Collingwood, Takaka, Murchison, Waimea.

B. G. Goodwin.—Headquarters, Blenheim. Counties: Marlborough and Sounds.

G. Esam.—Headquarters, Christchurch. City and Suburban gardens and orchards.

W. J. Courtier.—Headquarters, Christchurch. Counties: Kaikoura, Amuri, Cheviot, Ashley, Selwyn, Mount Herbert, Akaroa, Westland, Grey, Inangahua, Buller.

A. B. Mansfield.—Headquarters, Timaru. Counties: Ashburton, Geraldine, Mackenzie, Levels, Waimate, Waitaki.

W. T. Goodwin.—Headquarters, Dunedin. Counties: Waihemo, Waikouaiti, Taieri, Maniototo, Vincent, Lake, Tuapeka, Clutha, Southland, Wallace, Fiord.

E. T. Taylor.—Headquarters, Dunedin. City and suburban orchards and gardens.

COOK ISLANDS.

E. A. Reid.—Rarotonga.

RUAKURA RUST-RESISTANT OAT.

G. DE S. BAYLIS.

INSPECTOR R. ROWAN reports as follows upon a co-operative experiment undertaken by Mr. J. D. Muir, Manager of the Mental Asylum Farm, Mount Albert, Auckland:—

No. 1, Rosebery oat: Very rusty and full of smut. No. 2, Black Great Mogul oat: Very rusted. No. 3, Algerian oat: No rust; good crop. No. 4, Green's Ruakura Rust-resistant oat: Good crop; very clean. No. 5, Dun oat: Very rusted; not worth cutting. No. 6, Garton's oat: A good crop, about 4 ft. high, but practically useless on account of rust.

THE AGRICULTURAL EXPERIMENTAL STATION.

ITS TRUE OBJECTIVE.

"A SCIENTIFIC laboratory in the fullest and purest sense, given over to varied but purely scientific work, with fields and barns and herds ranking with microscope, balance, and burette as mere implements of research. It is experimental only so far as it may test, on a strictly laboratory scale, the suggestions of research. It is the investigative department of the college to which it may be attached, and, as such, may be called upon only to furnish new truths to be taught in the class-room and the laboratory, in the extension lecture, and on the demonstration farm. With this distinctive and restricted purpose the field of its operation is yet ample and sufficient.

"The acquisition of knowledge must precede its application, and further real progress in agriculture must, therefore, come not so much from improved instruction in the schools, from increase in our extension teaching, or from demonstration in the field, valuable and important as these may be, but mainly from research in the station laboratory.

"And yet a greater service may the station render to the State. Among all the public institutions, it should stand pre-eminently to illustrate the persistent, untiring search for truth. . . . For it is the search after truth that is the basis of moral training, and it is the profession of truth that alone shall make us free."—*Dr. H. C. White, in an address on the American Experiment Stations.*

PERSISTENCY REWARDED.

HOW LUCERNE WAS ESTABLISHED ON AN UNPROMISING MEDIUM.

G. DE S. BAYLIS.

THE land upon which this experiment was carried out is a light loam about 8 in. to 10 in. deep, upon a medium heavy subsoil—the property of Mr. B. Morris, Rangokokako—typical of the soil found upon the lower slopes of the hills in the district.

The land was ploughed and well cultivated, which fact was testified to by the freedom from weeds of the crop grown. Lucerne was drilled in on the 27th November, 1910, with 2 cwt. of slag to the acre, in 7 in. drills. On the 23rd February this was cut for hay. Subsequently the crop made little or no growth, and on portions of the area, where perhaps conditions were less favourable, it started to disappear.

Upon examination no nodules were discovered upon the roots, neither had the roots penetrated to the depth they should have done in the particular soil. Later on the crop which had made a good stand, became very patchy, irregular, and sickly. The opinion formed upon examination was that the roots had found the subsoil too raw and too poor in available plant-food. The crop had proved a failure, and consequently it was decided to plough it in.

Mr. Morris, however, prefers to farm his land rather than permit it to farm itself. The land had clearly proved itself incapable of growing lucerne. He adopted, therefore, a suggestion made to him to endeavour to make the land suitable for lucerne. In 1911 he put half the area into carrots, after liming it at the rate of 6 cwt. per half-acre, and using 158 lb. per half-acre of super, blood and bone, potash, and gypsum with the crop. The other half-acre was sown in swedes, 6 cwt. of lime being applied, 85 lb. of a mixture of super, bonemeal, potash, and gypsum being sown with the seed. The carrots yielded a very fair crop, but the swedes proved a failure, owing to the fly.

According to the scheme, the land was to be ploughed to a good depth about October. Previous to ploughing, 2 cwt. slag and 1 cwt.

kainit were to be broadcasted over the acre. It was then to be occasionally cultivated to keep it from weeds, and the seed sown late in November, 1912, with 1 cwt. slag and $\frac{1}{2}$ cwt. kainit per acre.

I visited this plot on the 26th February. Much of the lucerne was in flower, and was fully ready to cut. On the hill-crest it was about 12 in. to 18 in. high, and on the better land from 2 ft. to 2 ft. 6 in. or more. It was of a rich green colour, and plants were dug up, even upon the very crest of the hill-slope—upon the poorest and thinnest soil—with an abundance of nodules clinging to the roots. (A light sprinkling of inoculated soil had been given to the land previous to sowing the seed.) I understand that a heavy crop of hay has been since cut from this plot. It is again making good growth, and is of a rich green colour. Since it is now deeply rooted, healthy, and vigorous, I think Mr. Morris may be congratulated at having brought to a successful conclusion an experiment which had partially failed.

In all experimental work the farmer who thinks often gains more valuable information about his land from the experiment that fails than from the one that succeeds. Had Mr. Morris been content to pronounce lucerne a failure, and to have nothing further to do with it, nor give further thought to it, the time spent in his previous experiment would have been time wasted. As it is he has not only established a good stand of lucerne upon his property, but has qualified himself to give valuable information upon the necessary preparation of the soil in that particular area in order to bring about the successful establishment of lucerne.

National prosperity originates on the farm.

The frontispiece to this issue, "Changing Pastures on a Dasty Day," is a picture of the crossbred ewe experimental flock (Lincoln-Romney) of the Ruakura Farm of Instruction.

Home consists of the roof-tree, the fireside, a good woman, and children. Is the house worthily set in a fair-sized plot of ground? Is it planted about and adorned with trees, shrubs, and vines? Is it so good a house as the home deserves?—*The Breeders' Gazette*.

Do not leave repairs to the busy season, when attention to them will probably have to be again postponed. Do them now that you have the time. Plan out your next season's work well ahead. Method is always more profitable than haphazard work. Make your head save your heels.

Kurov, Otago...	Brown sandy loam (b) ..	1.70	5.51	0.25	0.018	0.058	Ditto	Faintly acid	0.90	0.85	0.16	0.27
Hakataramea, Otago	Light-brown friable sandy loam (b)	1.48	3.98	0.16	0.020	0.029	Light grey	"	0.48	0.42	0.32	0.17
Ohakune, Wellington	Friable brown coarse sandy loam	3.10	12.28	0.28	0.021	0.013	Light brown	Acid	0.53	0.10	0.06	0.09
Rarotonga, Cook Islands	Stiff dark-brown fine sandy clay (c)	11.70	18.68	0.32	0.027	0.091	Very dark brown	Neutral	0.78	0.28	0.07	0.69
Pleasant Point, Canterbury	Sandy clay (d) ..	2.28	7.12	0.27	0.030	0.028	Brownish grey	Acid	0.61	0.62	0.37	0.23
Upper Mangorei, New Plymouth	Light-brown friable coarse sandy loam (c)	7.02	22.00	0.40	0.012	0.018	Greyish pink	Faintly acid	0.27	0.14	0.07	0.24
Inaha, Hawera	Very dark fine sandy loam (c) ..	7.46	18.39	0.57	0.034	0.019	Pinkish brown	"	0.42	0.21	0.12	0.27
Hokitika (pakihi soils)	Light-brown silt (e) ..	1.28	4.72	0.16	0.011	0.004	Light yellow	Acid	0.08	0.04	0.03	0.02
"	Grey silt (e) ..	5.66	11.17	0.29	0.010	0.004	White	"	0.08	0.05	0.04	0.03
"	Dark-brown fine sandy loam (e) ..	5.48	25.73	0.49	0.015	0.004	Grey	Strongly acid	0.07	0.06	0.07	0.03
"	Light-brown fine sandy loam (e) ..	2.10	8.68	0.22	0.008	0.002	Light grey	Acid	0.07	0.06	0.03	0.03
"	Grey coarse sandy loam (e)	1.00	3.13	0.11	Trace	0.002	Light brown	"	0.05	0.08	Trace	0.01
"	Greyish - brown coarse sandy loam (e)	1.58	4.65	0.14	0.007	Trace	Light grey	"	0.05	0.05	0.03	0.005
"	Grey coarse sandy loam ..	0.78	3.69	0.11	0.005	0.003	Light - brownish yellow	"	0.02	0.05	0.04	0.02
"	Brown coarse sandy loam	3.48	5.57	0.17	0.007	0.003	Yellowish white	"	0.04	0.05	0.01	0.01
Kaipara, North Auckland	Brown fine sandy loam (f) ..	8.22	12.01	0.24	0.019	0.003	Light brown	"	0.13	0.11	0.09	0.03
West Eyreton, Christchurch	Brown fairly friable coarse sandy loam (g)	2.82	8.71	0.29	0.028	0.011	Pinkish grey	Faintly acid	0.28	0.49	0.21	0.13
Waihao Forks, Canterbury	Light-brown fairly friable sandy loam (d)	2.97	6.86	0.21	0.100	0.018	Dark brown	Acid	0.39	0.37	0.19	0.15

(a) Well supplied with plant-food. Soil from experimental plots.

(b) Soil from co-operative experimental plots.

(c) Well supplied with plant-food.

(d) Soil from experimental plots.

(e) These are typical "pakihi soils" highly deficient in plant-food, especially phosphoric acid. (See article by B. C. Aston on the "Pakihi Soils of Westland," *Journal*, Vol. 1, No. 1, p. 22; also Annual Report Department of Agriculture, 1909, pp. 464 and 474.)

(f) Well supplied with available potash, deficient in available phosphoric acid.

(g) Type of soil known as Canterbury scrub lands, consisting of wind-blown soil ("loess") and gravel, the flora being manuka (*Leptospermum*).

HOME SEPARATION.

CREAM-TESTING.

G. M. VALENTINE.

SAMPLING.

UNLESS a representative sample of the cream delivered to the factory is taken, it follows that the result of the testing cannot be correct. Where cream is received daily it is an easy matter to get a correct sample by means of a sampling-tube. Provided a supplier's cans are all of the same diameter, a small brass tube dropped into the cream and closed at the top end with the thumb will take a proportionate sample representing the whole depth of the can. With thick sour cream, however, so much adheres to the sampling-tube that it is no improvement on an ounce dipper. Under factory conditions, as we find them in New Zealand to-day, I have seen nothing better than a vigorous use of the perforated metal plunger. A gentle stir with the sampling-dipper or a circular stir with a stick is quite useless, but a thorough mixing up and down will get as close to a representative sample as it is possible to obtain with that class of cream. There is a very big difference in the fat-content of the cream on top of the can and that at the bottom, especially with thin sour cream, hence the necessity for thorough mixing. Neglect of this matter has led to the idea among suppliers that sweet cream tests lower than sour cream. It certainly does, unless the greatest care is taken to mix the sour cream so as to thoroughly break up the thick milk at the bottom of the can and thereby get a correct sample. A fairly proportionate sample can be taken with the dipper if a little judgment is used and any variation in the weights noted. The only possible means of getting the proportion exact would be to have, say, 5 c.c. graduations marked on the side of the sample-bottle, and take 1 c.c. for every 10 lb. of cream.

The sampling-dipper should be rinsed after handling rich cream, or the supplier following will benefit. In some exceptional cases of very rich cream or thin sour cream it may be necessary to warm or strain it in order to get a correct sample. Thin cream requires most care, however, as there is not the difference in the top and bottom of the can with very rich cream that there is with thin cream.

DAILY TESTS.

If properly done, there is no doubt that daily tests are more accurate than a composite test. An aliquot sample is just as necessary when dealing with two cans of cream from the same supplier as it is between a two days' supply. Against the risk of carrying a composite sample is to be placed the seven chances of mistake in actual testing, for there is only one with a composite sample. It is better to test once a week and do it carefully than to test seven times and hurry over it. The cost has been the principal reason why the daily test has not been taken up more generally in New Zealand, and it is still a disputed point whether the advantages compensate for the extra expense.

CARE OF SAMPLES.

Where a daily test is not made, samples must be kept in tightly corked bottles, or the evaporation of the moisture will cause the results to be too high. The condensation of moisture round the necks of the sample-bottles on a hot day should prove to any manager the necessity for this precaution. Tin-topped bottles are not to be depended on, as the lids soon get knocked about, and fit badly. One manager claims to have increased his overrun by 2 per cent. by adopting corked bottles last year, though his methods of manufacture were the same.

PRESERVATIVES.

Formalin, bichromate of potash, and a mixture of three parts of bichromate to one of corrosive sublimate are all good preservatives, but care must be taken not to use too much of either, which will cause discoloration of the "fat" column when testing.

The plan of keeping the sample-bottles in crates, and removing them to an artificially cooled room between deliveries, is being adopted by one factory next season. This should help towards keeping the samples in good condition. It is necessary to shake the bottles with a rotary motion after adding each sample, in order to mix the preservative.

TESTING-PERIODS.

Testing should be done weekly, but where conditions are such that this is not possible it may be done every ten days or fortnightly, but extra care will be necessary to keep the samples in good condition for the longer period.

MIXING.

Before taking the sample from the composite bottles they should be placed in a bath and heated to 100° to 110° and thoroughly warmed through. Overheating will melt the fat and harden the curd. Pour from one bottle to another, or mix with a wire brush, until the cream is smooth and free from lumps.

THE SAMPLE.

The use of a pipette for measuring cream samples into the test-bottles is absolutely unreliable. The Babcock test is based on a sample weighing 18 grammes. An 18 c.c. pipette will deliver 18 gr. of water, but cream being lighter it will deliver proportionately less. Further, the richer the cream to be sampled the less weight will the pipette deliver, and the test will be lower in proportion.

To get over this, a table is sometimes used to add a percentage to the results obtained when testing rich cream. This might be possible if all the samples were taken at the same temperature and were in perfect condition, but with sour or gassy cream this is also quite unreliable. To illustrate, four samples of fresh morning's cream were tested by weighing and by 9 c.c. pipette, the average by the scales being 0.75 of 1 per cent. higher than by pipette, the scales used being a sensitive chemical balance.

Scales :	51, 45, 31, 27	..	38.50	} 0.75 higher average by scales.
9 c.c. pipette :	50, 44, 31, 26	..	37.75	

Four samples of sour cream, on the other hand, averaged 1.5 per cent. higher by the scales than by the pipette.

Scales :	39, 39, 44, 38	} 1.5 higher average by scales.
9 c.c. pipette :	38, 38, 42, 36	

These figures serve to show that instead of sour cream testing higher, as some claim, it is considerably lower if the sample is measured with a pipette.

Another point is that the more vigorously the sample is shaken when mixing the lower will be the resulting test. This is due to the aeration of the cream. One has only to note the weight of a quantity of whipped cream to see what effect this will have.

THE 18 C.C. PIPETTE.

It naturally follows that if the 9 c.c. pipette is wrong the 18 c.c. will be further out. When using the 9 an equal quantity of water can be used for rinsing, but with the 18 the size of the cream-bottle will not allow of this. I have found the 18 c.c. pipette to be about 1 per cent. lower than the 9 c.c.

9 c.c. :	36, 43, 31	} Average, 1 per cent. higher by 9 c.c. pipette.
18 c.c. :	35, 42, 30	

WEIGHING THE SAMPLE.

In justice to both factory and supplier the sample should be weighed, and the scales used must be in perfect order. A chemical balance is the most reliable, but is usually regarded as too slow for factory use. The twelve-bottle scales more commonly used are accurate

if kept in good order, but they must be kept in a dry case when not in use, and be discarded when showing signs of sluggishness. Check tests should be frequently made with the chemical balance. Tests which I have made by this means showed a new set to be exact, while another set two years in use, under poor conditions, were giving results 1 per cent. too high, which would mean a reduction of about $2\frac{1}{2}$ per cent. in overrun.

Chemical balance : 39, 47, 33, 33, 35, 45, 33, 34. Average, 37.37.

12-bottle scales : 40, 49, 33, 35, 36, 45, 33, 36. „ 38.37.

It need hardly be mentioned that whatever scale is used the greatest care must be taken to see that the weighing is done correctly.

WEIGHT OF SAMPLE.

While 18 grammes is the full charge used in testing cream, equally correct results are possible if 9 grammes are used and the result doubled. Extra care is necessary, however, as any error in weighing or reading the "fat" column is doubled when a 9-gramme sample is used. When an 18-gramme sample is used it is also necessary to use a 50-per-cent. testing-bottle, as the average fat-content of cream received in New Zealand factories is over 30 per cent. The 50-per-cent. bottle cannot be regarded as the best for several reasons. Tests of the same cream which I have made by both weights showed an average of 0.5 of 1 per cent. lower reading by using the heavier sample.

9 gramme :	40, 41, 39, 35 .. 38.75	Average 0.5 lower by
18 „ :	39, 40.5, 38.5, 35 .. 38.25	

18-gramme sample.

Both tests were made in 50-per-cent. bottles, so it is probable that had the 9-gramme samples been done in 30-per-cent. bottles there would not have been even this difference.

TESTING-BOTTLES.

The bottles most commonly in use in New Zealand factories are the 6 in., 30 and 50 per cent. The former is much to be preferred. It is graduated to 0.5 of 1 per cent., which makes closer reading possible than with the 50-per-cent., which is graduated to 1 per cent. The 30-per-cent. bottle has the further advantage that, having a narrower neck, the graduations are much farther apart—say, 6 per cent. on a 30-per-cent. bottle occupying the same space as 10 per cent. on a 50-per-cent. There is also a difficulty at times in getting a clear straight line at the bottom of the "fat" column when using 50-per-cent. bottles.

METHODS OF SAMPLING.

The ordinary pipette cannot be regarded as the best means of putting the sample into the testing-bottle. The curd in the composite

sample will block up the small opening, and only the fat will be drawn into the pipette. This can be avoided by breaking the end off the pipette, or, when small sample-bottles are used, the cream may be poured directly into the test-bottle.

ADDING THE ACID.

When using a 9-gramme sample 9 c.c. of water is added, and a full charge of acid is used. With a little experience the added water may be used to great advantage in getting a good clear reading. By its use the temperature can be regulated to suit the strength of the acid.

If an 18-gramme sample is used, less acid is required, as there is less material for it to work upon than with milk.

Personally, I have always been able to get a much clearer "fat" column when using a 9-gramme sample than with an 18-gramme. This is no doubt due to the fact that in an 18-gramme sample of 50-per-cent. cream there are 9 grammes of fat and only 9 of milk serum, while in a 9-gramme sample of the same cream with 9 c.c. of water added there are $4\frac{1}{2}$ grammes of fat and $13\frac{1}{2}$ of water and serum. Should the mixture appear too dark after shaking the acid and cream together, a little chilled water added will sometimes check the action of the acid.

I have found it a good plan to shake the bottles again after the first whirling, as it helps to clear the fat from any dark specks. For the same reason I prefer to whirl three times instead of twice, as is sometimes done.

READING THE TESTS.

If the water added to the test-bottles has been up to 200, the samples will be about 140° in a turbine machine when finished. They must be at once removed to a water bath at this temperature, the water reaching to about the top of the "fat" column.

There is perhaps no point in cream-testing about which there is a greater difference of opinion than the reading of the "fat" column. Some managers read the extreme points, the same as in milk-testing, some to the middle of the meniscus or curve, and others again to the bottom of the meniscus, or, rather, to where they think it is. Others read to extreme points and deduct 1 per cent. when using 30-per-cent. bottles, and 2 per cent. when using 50-per-cent. bottles, with a 9-gramme sample. This last plan comes very close to being correct, but is not reliable.

The depth of the meniscus depends on the diameter of the neck of the test-bottle, and ranges from 0.5 in a small 30-per-cent. bottle to 1 and even 2 per cent. in a very wide 50-per-cent. bottle.

FAT-SATURATED ALCOHOL.

By the use of fat-saturated alcohol the meniscus can be done away with. Alcohol, being lighter than fat, floats on the top of the column, leaving a clearly defined flat line between the two.

As alcohol has a solvent action on butter-fat, however, it is necessary to saturate it with fat before using. This is done by dissolving about a small teaspoonful of unsalted butter in an 8 oz. bottle of alcohol. After adding the butter, warm and shake the bottle until no more fat will dissolve, and leave it to settle before using. Drop enough to fill a space of about 2 per cent. into the neck of each test-bottle as it is taken from the bath, and read off immediately. The alcohol will at once rise to the surface of the fat, and the meniscus will appear to float up to the surface of the alcohol. Should the line be irregular, give the bottle a shake, or add another drop of alcohol.

The best results seem to be obtained when the alcohol is prepared fresh each time it is required, and it should be warm when used. If cold, it has an inclination to form a whitish layer of cold fat on top of the column. Care must be taken not to get any undissolved fat when taking the alcohol from the bottle.

RESULT OF USING ALCOHOL.

The difference in reading the "fat" column to extreme points and reading with the alcohol added varies according to the diameter of the neck of the test-bottle, but it is always lower when alcohol is used. At the same time, it does not seem to vary with any regularity in all 30- or all 50-per-cent. bottles, so that it is not possible to make any rule for reading tests which will avoid the necessity of using the alcohol. Thirty-per-cent. bottles will vary from 0.5 to 1.5 per cent., using a 9-gramme sample, the average difference of those samples of which I have kept a record being 0.94 of 1 per cent. lower.

Read from Extreme Points.					With Fat-saturated Alcohol.	
37	..	..	..	..	..	36
43.5	..	..	..	..	..	42.5
38.5	..	..	..	..	..	37.5
45.5	..	..	..	..	..	44
28	..	..	..	..	..	27.5
41	..	..	..	..	..	40
23.5	..	..	..	..	..	23
34.5	..	..	..	..	..	34
36.5	..	..	..	..	..	35

Using 50-per-cent. bottles and a 9-gramme sample, the result with alcohol added has been from 1 to 4 per cent. lower than when reading

to extreme points, the average being 2.11 per cent. lower. Had an 18-gramme sample been used, the difference would be only half.

Read from Extreme Points.	With Alcohol.	Read from Extreme Points.	With Alcohol.	Read from Extreme Points.	With Alcohol.
52	50	43	42	37	35
46	44	32	30	47	45
32	31	53	51	35	33
28	26	33	31	42	40
53	51	29	27	50	49
47	45	47	45	36	33
33	31	43	39	37	35
29	27	50	47	39	36
36.5	34	36	33	47	45
38.5	36	35	33	35	33
36	35	37	34	39	36

A study of these figures does not show any apparent relation between the variation and the fat-content, a high test in some cases having the same small difference as a low one, and *vice versa*. The whole of these samples were held in a warm bath until read off, and were carefully checked by the managers of the respective factories at which they were done. Measurements were taken by the dividers.

It is absolutely necessary to maintain the temperature of the test-bottles between 130° and 140°. If they are allowed to cool, the alcohol and fat will be inclined to mix, which will defeat the object for which the alcohol is used. It will also cause a shrinkage of the "fat" column, and a consequent low reading.

All the tests quoted in this paper were weighed on a sensitive chemical balance, and fat-saturated alcohol used in reading, except where otherwise mentioned. The greatest care has been taken to ensure accuracy.

During the month of April the Moumahaki Experimental Farm was inspected by 230 farmers, and 180 letters of advice were despatched. Waerenga Experimental Farm was visited by 108 fruitgrowers and others. At Ruakura Farm of Instruction there were 500 visitors, 398 letters were received, and 337 letters were despatched. This farm was inspected by 704 people in March.

The calves of the dairy herds at Weraroa Experimental Farm are looking exceptionally well, and have exhibited no indications of scouring, a trouble experienced in former seasons. The improved condition is attributed to the use of chaff and pollard, the feeding of which was commenced when the calves were from two to three months old. This mixture was taken greedily by the calves, which were quite indifferent as to their milk ration at weaning-time. Shelter-sheds are being erected in the fields at this farm for the heifer calves during winter.

THE LONDON DAIRY SHOW.

EXHIBITION OF NEW ZEALAND CHEESE.

SOME time ago Mr. W. Wright, Inspector of New Zealand Dairy-produce in London, notified the Dairy-produce Division of the Department that the British Dairy-farmers' Association was willing to include in the schedule of its dairy show for 1913 a special class for colonial cheese, provided not less than twelve entries would be forthcoming in such a class. The conditions governing the competition were to be as follows:—

Class for Colonial Cheddar Cheese.—Open to makers only. Entrance fee, 10s. Total entries must not be less than twelve, each entry to comprise six cheeses of at least 60 lb. each. First prize, silver medal and £5; second prize, bronze medal and £3; third prize, £2.

On receipt of this advice a circular embodying the proposal was issued by the Director of the Dairy-produce Division to a number of the dairy companies manufacturing cheese throughout the Dominion, with the result that no less than eighteen of them indicated that they would be pleased to make an entry. Factories in both the North and South Islands promised representation.

Word to this effect was immediately despatched, through Mr. Wright, to the British Dairy-farmers' Association, which has replied stating definitely that the class has been included in this year's schedule.

It has been arranged with the exhibiting companies that the cheese will be collected in Wellington during the month of June, and shipped in one consignment to the High Commissioner for New Zealand in London, who will make all necessary arrangements for the cool-storage of the exhibits on their arrival, and will also see that the staging and showing of the cheese in the Royal Agricultural Hall, London, are carried out in the best possible manner.

This will be the first occasion on which a competitive exhibition of New Zealand cheese has been made at the great dairy show of London. It will without doubt be the means of bringing the quality of our produce under the notice of a large number of people who have hitherto not had the opportunity of seeing it under the most favourable conditions. In this way the display should act as a splendid advertisement for New Zealand Cheddar cheese.

BRITISH MILK BILL AND TUBERCULOSIS ORDER.

SPEAKING at a large meeting of dairy-farmers at Salisbury, called to consider the British Milk Bill and Tuberculosis Order, Mr. Sadler, who had been invited to address the meeting on the subject, said, "They hoped the Legislature would be as keen on regulating the importation of butter and cheese as it was in regulating the production of milk in this country, and they had the right to go further than the expression of a pious hope. Why, in the name of Goodness, should not the people who send us butter and cheese from foreign countries be put under the same regulations? While we cannot send our Inspectors abroad, we can impose upon the producers and manufacturers in other countries the same obligations by making it compulsory upon them to give a certificate that their goods are produced under the same conditions as provided for by the Act of Parliament in this country. It certainly is not calculated to produce respect among British farmers for their Home Government if they found that the conditions imposed upon their own products and manufactures were relaxed with regard to things from other countries which came in to compete with them."

A machine is being advertised in America for the incorporation of butter-fat with skim-milk or a solution of milk-powder in such a manner as to produce a commodity having the normal constituents of milk or cream, and being, in effect, milk or cream as far as legal standards as to ingredients are concerned. By this means it is claimed that butter-fat and other solids of milk when separated can be held indefinitely; and from them, by the aid of the machine in question, scientifically true milk and cream can be produced by amalgamation.

South Africa to-day possesses upwards of fifty well-established creameries, the total output of which is said to be in the neighbourhood of 8,000,000 lb. per year. In addition to this, farmers and others, according to the latest statistics, are responsible for a further 2,000,000 lb. to 3,000,000 lb., making in all 11,000,000 lb. per annum. This is a big advance on a few years ago, and there is every possibility of the progress being maintained. During mail week a new creamery was opened at Pietermaritzburg, the premises, buildings, and plant having cost £40,000. The capacity of the plant is $2\frac{1}{2}$ tons of butter per day.

ROOT CROPS AT RUAKURA.

WITH the absence of sufficient moisture the root crops at Ruakura Farm of Instruction are not bulbing as well as they otherwise would have done, but on the whole are very creditable. In the mangel crop the subsoiled portion of the field is giving better results than either the late or early ploughing at the ordinary depth of 7 in. In the swede manurial experiments the plots manured with a double dressing of basic slag and kainit carry at the present time the heaviest crops of roots, and present a great contrast to the plots receiving half the quantity of the same mixture. The plots dressed with basic superphosphate and sulphur, superphosphate and bones, guano and sulphur, and basic superphosphate and basic slag stand well to the front, the last named being the most even and healthy plot in the whole paddock. The no-manure plot can be classed only as an absolute failure; the crop will not be sufficient to pay for even a half of the cultivation. Plots dressed with phosphates and potash alone are better than those dressed with nitrate of soda in addition at an increased cost of 11s. per acre. Cross-dressings of lime have as yet shown little result. This field is of great interest to the numerous visitors.

SULPHATE OF IRON.

ON the 6th October last a quarter of an acre on the face of the Big Hill pasture at Ruakura Farm of Instruction was top-dressed with sulphate of iron at the rate of 1 cwt. per acre. As far as the eye can judge, the dressing has been beneficial, and at the present moment the plot is a brighter green than any other portion of the paddock. The growth of clover has been stimulated, and moss, which is prevalent on adjoining portions of the paddock, has to some extent been eradicated. On the other hand, sulphate of iron applied alone (with the seed) to a plot sown with rape-seed at the same rate per acre as above caused an entire failure of germination.

As the amount of sulphate of iron required by plants is exceedingly small, it is difficult to account for the beneficial results obtained in the pasture land, unless that it may be of benefit as a fungicide. A portion of No. 4 paddock (also pasture) was top-dressed on 25th February last, and this will be carefully watched.

WOOLLY APHIS.

SALT FOR THE CONTROL OF THE DISEASE.

T. W. KIRK, F.L.S.

At the Conference of Orchard Instructors held in August, 1911, it was mentioned that several growers believed they had succeeded in controlling American blight by the use of salt. It was therefore arranged that the Instructors should endeavour to secure the co-operation of one or more growers in each district in order to carry out experiments in this direction. I suggested they should spray one tree with salt solution, and leave one untreated near it; take another tree and apply a dressing of salt to the soil; and a fourth tree which should be sprayed with the salt solution, and also have an application of agricultural salt to the soil. It was arranged that from 2 lb. to 4 lb. of salt should be used for the soil-dressing, according to the size of the tree.

The co-operation of the Fields and Experimental Farms Division was also solicited. Following are the reports received, from which it will be seen that the tests do not support the belief that dressings of salt will control the woolly aphis:—

SUMMARY OF REPORTS OF EXPERIMENTS CARRIED OUT AT THE EXPERIMENTAL FARMS AND UNDER THE DIRECTION OF ORCHARD INSTRUCTORS IN PRIVATE ORCHARDS.

J. W. Collard, Orchard Instructor, Whangarei.

Following are the results of experiment:—

Quantity.	Variety.	Date applied.	Result.
<i>Whangarei.</i>			
4 lb. ..	1 Warren's King ..	20/9/12	Nothing noticeable by way of improvement.
6 lb. ..	1 " ..	20/9/12	Ditto.
<i>Northern Wairoa.</i>			
10 lb. ..	1 Reinette du Canada ..	30/9/12	No improvement.
8 lb. ..	1 Ohinemuri ..	30/9/12	"

W. R. L. Williams, Orchard Instructor, Auckland.

Acting on your instructions, I treated three affected trees with salt for the control of woolly aphis. There were a number of other trees similarly affected adjoining them, and which were not treated for comparative purposes.

(a.) Sprayed with salt at the rate of 1 lb. to 4 gallons water. (b.) Sprayed with salt at the rate of 1 lb. to 4 gallons water and the soil top-dressed around with 3 lb. salt. (c.) Soil around top-dressed with 3 lb. salt.

An examination was made on the 26th January, 1912, with the following results:

(a.) Showed a considerable amount of live woolly aphis, although probably a slight

improvement. (b.) Woolly aphis still pretty bad, but shows a slight improvement, although doubtful if it will be maintained. (c.) This tree has the least infection, and shows a great improvement. This, however, is anything but conclusive, as other trees of the same sort untreated also have much less woolly aphis infection this season than might have been expected.

J. A. Campbell, Orchard Instructor, Hastings.

No definite experiments were carried out by me last season when stationed in the Waikato, but I recommended several growers to treat affected trees with dressings of salt applied to the soil round the roots. No beneficial results were noticed by those who tried the treatment. I know of some Jonathan apple-trees which are growing half in an asparagus-bed which is dressed each season with salt, but the trees, which are now about five years old, were badly affected with the aphis last summer.

J. H. Thorp, Orchard Instructor, Nelson.

When stationed at Timaru I carried out experiments with salt on some very badly affected trees. The treatment, however, was useless, the trees being simply white with aphis when examined at the end of the season.

W. J. Courtier, Orchard Instructor, Canterbury District.

I have given the salt method a trial by dressing the soil round the trees and lightly working it in, also by spraying with a strong solution when the trees were dormant. The result has not been very satisfactory, only a very slight improvement being noticeable.

E. A. Reid, Orchard Instructor, Christchurch City and Suburbs.

Two six-year-old Dougherty trees badly infected with woolly aphis were selected and treated during the winter of 1911. A dressing of salt $2\frac{1}{2}$ lb. per tree was lightly worked into the soil during latter end of June. At end of July the trees were sprayed with salt solution, in the proportion of 15 lb. salt to 60 gallons water. When examined in March, 1912 (end of the season), the trees were a mass of woolly aphis, a marked contrast to trees of same age and variety growing in the same patch and treated with Montauk spray in July and infected parts painted with the undiluted solution during growing season. On these trees it was a hard matter to find woolly aphis. These experiments showed that salt was quite useless in controlling the aphis.

Waerenga Experimental Farm.

The following trials were carried out on the 16th September, 1911: (1.) Four apple-trees were sprayed with a solution of 5 lb. salt to 20 gallons water. (2.) Four trees were treated with salt as a fertilizer—3 lb. of salt per tree. (3.) Four trees were sprayed with the same solution as No. 1, and were treated with a root-dressing the same as No. 2. (4.) Three trees were left untreated.

Up to the present time there is no visible difference in any of the trees. The aphis has not been checked in any way. Variety tested, Reinette du Canada.

Ruakura Experimental Farm.

Three experiments were carried out on the 15th September, 1911. The varieties of apples chosen for the experiment were: Cox's Orange Pippin, Byhill Pippin, Scarlet Pearmain, Rhodes Island Greening, Allington Pippin. In all cases trees of each were treated as follows: (a.) Sprayed with a plain solution of salt in the proportion of 15 lb. to 50 gallons. (b.) Root-dressing of 3 lb. of salt per tree. (c.) Untreated.

Neither of the treatments (a) and (b) gave any beneficial effects over (c). This applies to all varieties above mentioned. With the variety Cox's Orange Pippin, trees that had received the root-dressing were worse with woolly aphis the following season than those trees left untreated.

Tauranga Experimental Farm.

About two dozen apple-trees were treated with salt. (a.) One-third of these had 4 lb. salt scattered round them within a circle of 9 ft. (b.) Another third had the same amount of salt scattered around them, and also were sprayed with a solution of salt water, 1 lb. salt to 1 gallon of water. (c.) The other third were sprayed with the same salt and water, but had no salt round the trees.

Results.—(a.) Did not seem to be any freer from disease than trees untreated. (b.) Appeared to be freer from aphis for a longer period than those only sprayed. (c.) These trees were freed from aphis, but it did not appear to kill the eggs, as they were again affected by the end of December.

Arataki Experimental Farm.

On the 9th September, 1911, fourteen rows of apples were treated with agricultural salt at the rate of 3 lb. per tree, each row having a check row of same variety untreated to determine results, which were as follows: The treatment had no effect on the few trees that were slightly attacked with woolly aphis, but the trees treated showed a better development of growth than those untreated. The soil round the treated trees also held the moisture up to the surface all through dry summer, and no doubt this accounted for the extra growth. Another point worthy of notice in this experiment is that the treated rows only had to be hoed round once at later end of season, the salt keeping the weeds in check, while those untreated had to be hoed round every two or three weeks.

Moumahaki Experimental Farm.

On the 19th September, 1912, a line of cordons, sixty-two in number, were selected, and of these fifty were sprayed with a solution of salt, the balance, twelve trees, being unsprayed. The solution used was 2 lb. salt to 3 gallons of water. The fifty trees were also treated to a mulching of salt at the rate of 5 lb. to twelve trees. There is no apparent difference between the condition of those treated and the untreated ones.

Weraroa Experimental Farm.

Experiments were duly carried out in accordance with instructions. The spray was found to be more effective against the aphis than any other spray used, but the same difficulty of reaching all the affection exists, and, though the work was carefully carried out, aphis soon showed on the trees. Further, this spray had not the slightest effect on scale, and would therefore be impracticable where both pests existed. The ground-dressing had no effect on the aphis whatever, although the application was repeated at a later date, about two months after the first.

AMERICAN DEPARTMENT OF AGRICULTURE.

In concluding his sixteen years' work of directing the United States Department of Agriculture, Secretary Wilson reviews the progress of American agriculture during that period, and in particular the development of the Department of Agriculture, more particularly its great publication work. When Mr. Wilson (a native of Ayrshire) took charge, says a bulletin of the International Institute of Agriculture, in the year 1897 the farm production of the United States was worth £800,000,000: it ended in 1912, with a production valued at £1,906,400,000. The number of persons employed by the Department of Agriculture grew from 2,444 in 1897 to 13,858 on the 1st July, 1912, and the appropriations for the Department increased from £654,580 for the fiscal year ending 30th June, 1898, to £4,948,609 for 1913. In 1897 the mail requests for publications of the Department barely exceeded 500 letters per week. During the past year the weekly mail has exceeded 52,000 letters. With a printing fund of £23,377 the different publications printed in 1897 were 424, and the editions aggregated 6,541,210 copies; in 1912, with an appropriation of £911,000 the different publications were 2,110, aggregating 36,678,557 copies. In 1897 the number of employees on the Publications Division was 61; in 1912 they aggregated 197, an increase of nearly 225 per cent.

The 13,858 persons employed by the Department do not by any means represent the expert and administrative officers placed at the service of the American farmer, for each State has its own Department and experiment station, the whole vast network being under the controlling influence of the Federal Service, which has been developed on such progressive principles by the late Scots-American Secretary and Administrator.

THE HEMP INDUSTRY.

W. H. FERRIS.

GENERALLY speaking, the quality of phormium hemp graded last month was an improvement on that of the previous month, a higher percentage of good-fair being shipped, but both the fibre and the method of preparation still leave much to be desired. The improvement has been noticeable in stripping, scutching, colour, and strength. Certainly a good proportion of the leaf being milled, owing to its diseased condition, has not enabled anything but a fair pointing fibre to be milled from it. No doubt the reason for the improved character of the better lines coming forward has been the more careful sorting of the hemp at the scutching-bars. Instead of baling all qualities in the most promiscuous manner, as was the case with much of the hemp forwarded for grading for a good part of this season, the better qualities were separated out from the inferior, and thus provided material for uniform lines of a satisfactory grade. More than one line which last month was only reaching a fair grade, owing to the high percentage of inferior fibre present, has this month been scoring as high as 76 points, owing to the elimination of the poorer quality. Thus, in place of the whole output of the mills in question being graded a high-pointed fair, the greater proportion of the fibre is now going into good-fair, with the smaller proportion grading fair, mostly high point (65), but in some cases low point (63).

While improvement has taken place, there are individual cases where a very poor standard of work continues, due in several instances to inexperienced stripper-keepers being employed, who are unable to keep the stripper up to its proper standard of work. With poorly stripped leaf no after-process can remedy the trouble.

In one or two instances a desirable grade is being lost owing to the unsatisfactory leaf being worked with—the leaf varying greatly in length—and no attempt being made to remedy the trouble by the simple procedure of sorting the leaf.

Several lines affected by the flooding of the drying-fields have come to hand. Here there is no remedy. The fibre must be graded down.

Hawke's Bay fibre continues to be of an excellent standard. Out of 277 bales of fibre graded last month no less than 132 reached a fine grade. Marlborough fibre is also of gratifying quality. Of 669 bales graded, 26 were superior and 211 fine. Certainly, a good leaf is available in both these provinces, while the majority of the mills are doing excellent work.

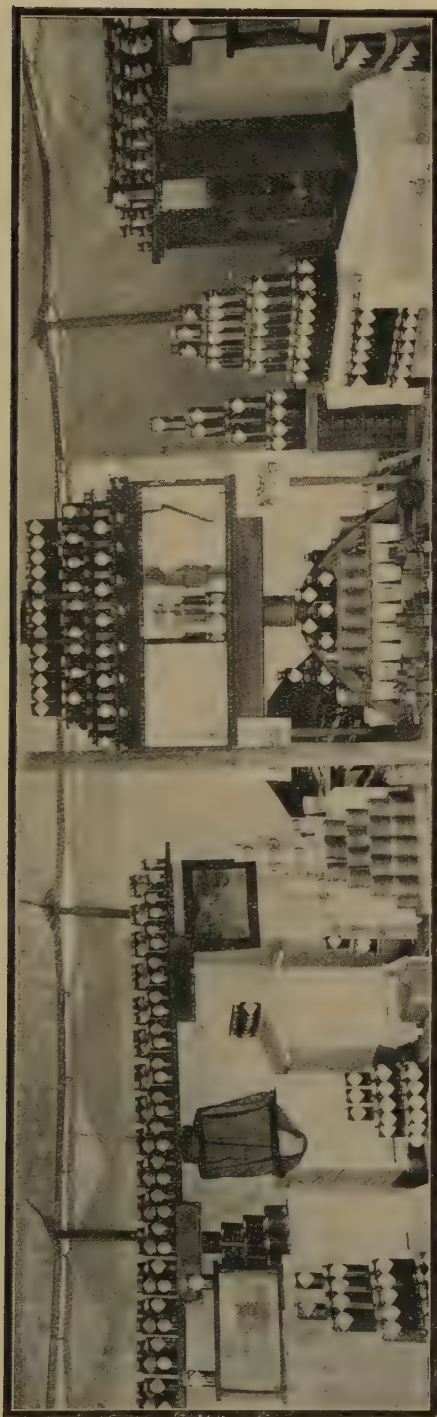
THE APIARY.

MARKETING THE CROP.

F. A. JACOBSEN.

THE important question of marketing the products of the apiary to better advantage is now, it is gratifying to know, receiving the attention its importance demands. Canterbury beekeepers are combining to this end. It is proposed to establish a depot at Christchurch in charge of a capable man, for the purpose of regulating market supplies of honey, and thereby maintain its value on the local market. Beekeepers as a body are so busily employed at the season of harvest, and are so much wrapped up in the work of managing their bees, that they are apt to neglect the commercial side of their business. If this were placed in competent hands much benefit would undoubtedly result. Should the Canterbury idea succeed, similar movements will assuredly be established in other parts of the country. When the necessary co-operation comes about the industry will be placed on a most satisfactory basis.

Much attention has been given to the producing of large crops of honey, while until recently little time was given to effective marketing. The crop was usually sold at the purchaser's own figure, and was delivered in kerosene or petrol tins. Again, when a good harvest was gathered the markets were usually burdened with an excess of produce, and prices naturally declined. Honey should, as a food of high-standing quality, receive every care, and it should be put up in the most attractive form. In nearly every case the honey is sold in 56 lb. tins, and its subsequent preparation for sale is left to the grocer. He may or may not know something of melting and bottling honey, but in many cases the delicate flavour of otherwise excellent produce is spoiled through overheating. Conditions such as these do not tend to increase the demand and make honey the popular food it should be. To win the confidence of the public, and protect the industry, it would be an excellent thing if beekeepers, in selling their honey to grocers, would make arrangements to bottle or tin it for them. This would place the honey before the public in its original state, with none of its good qualities lost. The beekeeper could supply his own neat label, and make arrangements with the grocer to have a display of the produce in some prominent part of the window. Failing this, he should send minute instructions as to melting.



FORMS OF MARKETING.

One of the forms in which the consumer buys honey is in various - sized tins. This is a cheap way of putting up the crop, as tins are not nearly so costly as glass jars, and stand more handling. The demand is greatest for the 2 lb. size. When catering for the fancy trade 1 lb. and 2 lb. glass jars are used. The screw-top kind is preferable. No other methods of marketing honey show the produce off to better advantage.

Compressed-paper-pulp pots, the shape of a tumbler, are attracting more attention now than formerly. They are very clean in appearance, and look especially attractive when the printing is neatly done on the outside. The pots have a white paraffined inside surface, and are less costly than glass or tinware. Still another method, and a very good one, is that of preparing honey in Aikin honey-bags. These are of tough paper coated with paraffin. The honey is poured into them, and allowed to stand until granulation has taken place.

PAT-HONEY BOXES.

The honey is run into these boxes just before granulation. The box is then divided off into compartments with sheets of tin. The blocks from the compartments are just the right size for recutting into pats. The honey is allowed to granulate hard. The boxes are then un-

screwed and the blocks cut up on a recutting frame. The honey-pats are wrapped first in plain parchment paper, then in a printed wrapper, like butter. This method entails a considerable amount of work, and, unless the beekeeper has plenty of time, which is not likely, any of the other methods are preferable.

PHENOMENAL YIELDS.

Mr. Arundell, of Patea, Taranaki, reports some exceptional yields this year. His queens were originally purchased from the queen-breeding apiary of the Waerenga Experimental Farm, but some of them are daughters of Waerenga queens bred by himself. His two best hives produced last year 331 lb. and 155 lb., and this year 463 lb. and 409 lb. respectively. His other hives, of which he has about twenty-eight, did almost equally well.

A remarkable average yield from thirty-four colonies of mainly hybrid bees was secured by Mr. Lloyd, of Manaia, Taranaki. Three tons, all but 5 lb., have been extracted, an average of 197 lb. per colony, while about 1,000 lb. has been left in the hives for spring feeding.

A STRIKING DISPLAY.

The accompanying photograph is a fine example of individual enthusiasm combined with commercial enterprise. It illustrates a display made by Mr. A. L. Luke at the last Taihape show. Mr. Luke believes in doing things thoroughly, and in this he has set an example to others in the beekeeping business.

The whole display was produced and prepared by Mr. Luke himself, and formed one of the most attractive exhibits of honey ever made in the Dominion.

SEASONABLE NOTES.

A beekeepers' association has been formed in Marlborough. Twenty-two beekeepers attended the initiatory meeting. Mr. Frank Daines, Blenheim, is the secretary.

Now you have time to spare do the many little things which if postponed for a busier period will be neglected altogether.

Have you any old hives that need repairing? Do this now. Painting and otherwise preserving the plant can also be done in the off season with advantage.

System is invaluable in beekeeping. Therefore map out your next season's work and make the necessary preparations now, so that every detail may be carried out without delay and in its due season.

ORCHARD WORK FOR JUNE.

W. A. BOUCHER.

JUNE may be regarded as a month during which much important work in the orchard may be accomplished.

PLANTING.

In some of the warmer districts of the Dominion the planting of young trees may be carried out during the early part of the month, provided the soil has been well prepared and is otherwise in a suitable condition. For the benefit of those who have not had a great deal of experience in the treatment of moisture-retentive clay lands it may be as well to again remind intending planters that if the soil is wet and cold the setting-out of orchard-trees may with advantage be deferred until spring weather has brought about a satisfactory condition. In the meantime, trees purchased to order will probably have arrived. These should be heeled in and allowed to remain until suitable soil-conditions admit of planting. Instructions for heeling-in will be found on page 398 in the November (1910) issue of the *Journal*.

TREATMENT OF NURSERY STOCK FOR INSECT PESTS AND FUNGUS DISEASES.

Most nurserymen nowadays adopt satisfactory methods of treatment for the control of insect pests and fungus diseases before the despatch of fruit-trees from their nurseries. In such instances purchasers are saved any further trouble in this respect. But if such treatment has not been carried out before the trees come to hand, then it will be advisable before heeling in or planting out to take such precautions as may be required against infection by insect pests or fungus diseases. The simplest and least expensive method of accomplishing this is to prepare a cask of the Bordeaux mixture, 10-10-40 formula, and, bundle by bundle, holding the roots upwards, dip the branches and stems into the mixture as far as the soil-marks. Later on the trees should also be dipped in the red-oil emulsion, winter strength, in order to destroy the eggs of red spider, mussel scale, &c. If these necessary precautions are effectively carried out the trees will require little or no further attention for the control of most orchard pests and diseases during their first season.

SPRAYING PEACHES AND NECTARINES.

Many growers are still content to spray their peach and nectarine trees once only during the dormant season with the Bordeaux mixture,

10-10-40 formula. The best results in controlling the fungus diseases that attack these fruits can only be attained by spraying twice, the first time in the autumn as soon as possible after the leaves have fallen, and the second in the spring when the buds have commenced to swell.

MEALY BUG.

Of late years this pest has been spreading considerably in apple-orchards in several localities. Consequently it becomes necessary to draw the attention of growers to the necessity for adopting such measures as may be required to keep it well under control. No doubt in many instances the fact of its existence in the orchard is unknown to the owner, and for this reason it seems desirable that all apple-orchards should be thoroughly sprayed during the dormant season with the red-oil emulsion diluted to the winter strength.

MUSSEL SCALE AND RED SPIDER.

Both these pests are much more in evidence than they should be, even in districts where spraying has been regularly carried out each season. It would almost appear as though either an inferior grade of oil has been used, the emulsion not properly made, or has been diluted to too great a degree. On account of the necessity for keeping mealy bug, mussel scale, and red spider well under control, so that fruit arriving at the markets may pass unchallenged, it would be as well for growers to carefully investigate the reasons for the more or less indifferent results that in many instances have followed the applications of spraying-compounds.

CHERRY-LEAF SCORCH.

As a precaution against attack by this destructive fungus, cherry-trees should be sprayed with the Bordeaux mixture, 10-10-40 formula, as soon as the leaves have fallen.

BROWN-ROT OF LEMON.

Growers may again be reminded that treatment for the prevention of attack by this fungus should be adopted before the end of June. The application, as previously suggested, of pulverized sulphate of iron at the rate of 1 lb. to 4 lb. per tree, according to the size and age of the trees, can be recommended with confidence. The sulphate of iron should be scattered over the surface of the soil beneath and around the trees, and lightly worked in. The crop should also be protected by spraying with the Bordeaux mixture, 4-5-50 formula.

STRAWBERRY-LEAF SPOT.

Plants that have remained comparatively free from the "spot" during warm, dry weather will frequently show considerable infection when cold, wet weather has set in. Strawberries should be thoroughly sprayed with the Bordeaux mixture, 4-5-50 formula.

PRUNING.

In order to avoid a rush of work later in the season, the pruning of the orchard may be commenced as soon as the leaves have fallen from the trees, and continued, as the weather permits, during the months of winter. As disease may be carried from one season to another on the wood that has been removed when cutting back, all prunings, as far as possible, should be gathered up and burned.

GRAPE - CULTURE.

S. F. ANDERSON.

VINEHOUSE WORK FOR JUNE.

THE pruning of the early-ripening vines may commence about the end of this month, provided the leaves have fallen or a tap of the rod brings them off. Before pruning, should it be required to obtain cuttings or scions for grafting, these should be selected and taken off the vines first. The proper wood for this purpose is that which has borne fruit, is well ripened, and short-jointed. Cut to convenient lengths, label each kind, bury them up to the top joint in moist loose earth or sand, and place in a cool shed—the back of a building or other suitable spot where the sun cannot reach them. It is necessary for grafting that the scion should be dormant and the stock growing. The growth of scions must therefore be retarded. When pruning rods of one year's growth the bud at the base of the lateral (there is only one at this stage) is prominent, and no mistake need be made where to make the cut. As the vines get older, however, the buds get smaller, and there are more of them, so that the beginner in vine-culture is more likely to be confused. There is generally one, if not so conspicuous as in the young rods, immediately at the base of the lateral, that can be relied upon, above which the cut may be made. This applies to the majority of vines now being cultivated under glass. The exceptions are Barbarossa and Duke of Buccleuch. In pruning these it has been found necessary

to leave the last joint of the lateral, because the bud at the base above referred is not to be relied on. If the base bud does start, then the one on the joint end can be rubbed off. Still referring to the above-named vines, some growers prefer growing a new rod every year. To do this two or three rods are grown to one vine, one of which is renewed each year. The pruning of the vines should be done as soon as ready to allow of the other work being proceeded with, such as thoroughly cleaning the house, forking manure into the borders, whitewashing walls, and painting woodwork. Remove all old ties and tendrils from the wires, leaving no harbour for insect eggs or spores of fungoid diseases. All loose bark should be rubbed off (not scraping the vines) and caught on cloths or newspapers spread under the vines, so that they can be taken away and burned. Should any of the white fluff containing mealy-bug eggs be observed when cleaning the rods, it should be immediately touched with methylated spirit. After pruning and cleaning up, thoroughly wash or syringe the vines with hot water. If the house is free from mealy bug, this cleaning will be sufficient. Should, however, mealy bug be in the house the rods must be painted with the clay-and-tar mixture or one of the paints recommended by the Department.

VINEYARD WORK.

Pruning can be commenced this month. The system followed in the vine-growing portion of the Dominion for pruning the European varieties of the wine-grape vine is known as the Double Guyot. It consists of confining the fruit-bearing portion of the vine to two arms, or, as they are termed, rods, extending about 4 ft. each way from the crown of the plant, and fastened down to the bottom wire of the espalier fence on which they should be trained. This wire should not be more than a foot from the ground. As these fruiting-rods are renewed every year, the pruner has not only to select the two best rods for tying down, but to provide for the following year by cutting back those shoots to spurs that are to produce the fruiting-rods the following year. It is a case of looking two years ahead. In providing the vine with the rods for the following season's fruiting and spurring shoots for producing fruiting-rods the year after, it is necessary to make the selection in such a way that the shoots spurred back should come below those retained for fruiting-rods. If this is not done the stem of the vine gets higher every year, which, by judicious pruning, can be avoided.

It is proposed to prepare a leaflet setting forth by description and illustration at greater length how this work is done. In the case of pruning and training the American class of vine, such as the Albany Surprise and Isabella, the grower is referred to Leaflet No. 11 (New Series).

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

Asparagus.—The matured tops—the runner growths—should be cut down when sere. It is best to do it as soon as this condition is reached and before many of the berries fall. If left till the tops are perfectly dead, most of the berries will fall when the tops are handled, and, as the seed germinates freely, a host of young plants would come up as weeds, causing avoidable labour. If the stems are thick, as we may hope they will be, they are somewhat hard to cut with a knife. I use a slasher, which does the work in a fraction of the time it would take to do it with a knife. Cut as close to the surface as possible, for the sake of neatness. I am not aware that there is any other reason for it, though some claim that there are other reasons. If the beds are made in the old way—viz., rows close together on raised beds, with alleys between—the surface soil should be loosened and several inches thickness of it raked off in to the alleys. Then give a good coating of stable manure to the beds. The thickness of the layer that will be serviceable largely depends on the state of the manure. It is preferable, according to the consensus of opinion, to use it in a rather fresh state, as it decays down in a lighter condition than would heavy, fat manure, thus making for warmth in spring, and greater friability of soil. The soil thrown into the alleys is to remain there till spring. At that time the manure will have decreased very much in bulk. The soil is then thrown up on to it, to make a clean finish. The chief reason for leaving the resoiling till spring is that because, if put on earlier, it would grow weeds, while oats, &c., in the manure would break through; whereas if left till spring it will cover any green growth there may be, and remain clean for the young heads to come through. If the plants are on the flat, and the rows are further apart than in the old style, no earth can be taken off. Merely a good top-dressing of manure should be given, first having lightly pointed the surface over if at all firm. 6 in. or 8 in. deep of fairly fresh manure is a good dressing for raised beds, half that depth is sufficient for beds on the flat.

Seakale.—All the old leaves should be dead or nearly so; they may be cleared off. Precautions should be taken to guard the crowns against slugs. They have a liking for these, and if the slugs are shut in when the crowns are forced they damage the young shoots. Forcing may be

done at any time after the old leaves are off. If there is a good plantation, forcing may continue in batches till natural growth commences. The system of forcing described in English books will be rather mystifying to many colonial gardeners, but it need not be considered, as few people in this country could command the means there imperative, nor would it be necessary for us to take so much trouble, our milder climate rendering outdoor forcing more easily accomplished. It would be more correct, perhaps, to say that colonial requirements can be catered for by the rough-and-ready means referred to, and that large supplies are more economically provided by the better means afforded by heated houses. Forcing is accomplished by the aid of fermenting stable manure. This should be fresh and contain a good quantity of straw. The straw is necessary for a two-fold reason. Droppings without straw become saturated by heavy rain, and do not retain heat, and a better covering can be made by strawy manure. It is best to give the manure a shake over a few days before using: it heats the better for it. Manure from corn-fed horses is requisite, for the layer will be but a thin one, and that from grass-fed animals does not retain heat. In England there are earthen seakale-pots. These are made bell-shaped. The broad end rests on the ground, surrounding a clump of crowns, and at the top is a movable lid, with a knob to lift it with. These pots are the only perfect covers. Here we make such shift as we can with boxes. Kerosene-cases answer very well. Some people even use kerosene-tins, but the clumps must be very small for the tins to cover them. A layer of fermenting manure is packed around and over the boxes. Several clumps must be forced at once, or the manure would not be in sufficient bulk to retain heat. It would not do to put a large quantity round one box, or the heat would be too strong, resulting in the crowns being scalded by the hot vapour which would find its way through the loose top of the box. Sufficient heat is generated by a ridge of manure, which covers the box about 12 in., and projects a like distance on each side. If there is a desire to have seakale ready for a special day, allow fourteen days for forcing. If the heat is good, that will be ample. When a crown is cut take it with a piece of the old neck, so that the rosette of stalks remains intact.

Rhubarb.—The advent of evergreen varieties of rhubarb has made forcing unnecessary, at least over the greater part of the Dominion. I am not aware how it behaves in those parts subject to severe frost and snow. In all other parts it would be more than ridiculous to force rhubarb. We are pulling an ample supply from a bed of Topp's Winter, the stalks being of fair substance, up to 30 in. long, and many of beautiful red colour, though they vary much in this respect. They are certainly of far better average quality than forced rhubarb. There may be some parts where forcing is desirable. The *modus operandi* is

the same as for seekale in every respect; but, as with seekale-forcing, English directions will be misleading to a novice. You are advised to lift the crowns some time before forcing, as it causes them to force better. It should be understood that the lifting is only a part of the English system, where the forcing is done in hothouses. The crowns are taken from the open ground, the roots very much reduced, and the crowns packed close together in a variety of ways, and, after forcing, the crowns are thrown away. When the forcing is done in the open ground there is no need for lifting. The crowns are covered where they grow, the same as seekale.

Peas.—There are so many variations of soil and climate in the Dominion that it is not possible to state a time for sowing that will be right for all. General principles are, however, unalterable, and where conditions of soil render it safe to stray far from them it may be safely assumed that the conditions are very far from normal. I know of a place where peas are sown early in May and are gathered early in October. This place will grow absolutely nothing in summer, because it is too dry. In ordinary circumstances many people sow towards the end of May, in the early twenties. The usual result is that peas are gathered about the 28th October, but I have never seen them give a crop—indeed, scarcely half a crop—and in windy situations they are frequently nearly all destroyed, because growth is too slow during June. In similar places, if a first sowing is made on the 1st July, the first gathering should be made on the 9th November, but this will be a full crop, as the plants had growing weather all the time. I gave up the May sowings years ago, and this after a fair trial, as not being worth while. In the garden I am now working I am seldom able to sow before August. As a rule, the soil is too wet before that, but a month later in sowing makes a difference of only about two weeks in gathering. Local conditions have so much effect that to some extent each grower must judge for himself when it is best to sow.

The question of variety, however, is on a quite different footing. Varieties are classed as first early, second early, main crop, and late. First earlies are usually of a very dwarf character; their merit is that they mature a crop quickly, but, please note, they are not quicker in growth than later varieties, but, being more precocious, they sooner bear seed. This, however, is at the expense of growth, and the crop is very small, therefore quickly over. For that reason I regard a true first early as the most expensive of all to grow, because there is less return. They give us the earliest peas, and we pay the price. The true first earlies are represented by Little Gem, American Wonder, Richard Seddon, and others. It would be wrong to grow these except as the first crop; they are meant for that only. The second earlies have many representatives. I will take two—Carter's Springtide and

Daybreak. These two will, as a rule, require about ten days longer than Richard Seddon and other true dwarfs, but the crop will be quite threefold in quantity, and will last three times as long. It is obvious, therefore, that it is far more profitable. This is why I advise cottagers who have little room and farmers who have little time to spare, and who will not value the few days earlier, to let the true dwarfs severely alone. In domestic gardens of more pretention, however, whether it be on a station or suburban-villa grounds, the earliest varieties should be regarded as indispensable. The main-crop varieties should be the mainstay of the season's supply, because it is they that give the quality and size of pea.

Broad beans may now be put in at any time. Sown within the next four weeks, the first gathering should be ready early in November.

Lettuces and *endive* may be planted in well-drained ground.

Beyond this there is no seed-sowing or planting that comes within ordinary practice for the next few weeks. Efforts should be directed towards keeping the place clean; weedy ground should be dug over, as well as all plots as they become cleared of crops. The soil will be more benefited by exposure to air and what sun there is than by growing weeds, which tend to make the soil cold and sour, and afford shelter for the slugs, &c., that will be a plague in the spring. The cleaning-up should extend to advancing crops of spinach and silver-beet, which will prove of considerable value in early spring—that is, if properly thinned to enable the plants to attain good size and otherwise encouraged to grow. Ground intended for early planting, and which is to have stable manure dug in, should be prepared as soon as possible. In general practice it is better to let the ground settle a few weeks than to dig in manure and plant or sow at once. This applies particularly to onions. The seed should go into firm soil. A loose bed is prejudicial to success. Where green crops have been grown for turning in, whether it be peas, tares, mustard, or oats, they should be turned in soon, so that the ground may settle, and the green matter changed by decay to render it available as plant-food before the crop is put in.

FLOWER-GARDEN.

Dahlias have long since been cut down in many places; in others they have gone sere by the natural process. What to do with them is the question asked by many. The nurseryman has his way, a way that complies to his demands from the tubers. A quite different way is better in the average garden. A very large number of dahlias are lost every year, partly from lack of understanding the physiology of the tubers and partly through want of appreciation of the dangers that beset them. When dahlias are lifted from the ground they are

found to be furnished with a mass of tubers. These vary considerably in different varieties; some are few in number and very large, and some small in size but in large numbers. All alike are practically useless to the future plant, but are of immediate use in supplying moisture to preserve the vital parts, which are the necks, the portion of growth intermediate between the tubers and the stems. It is from this part that the future shoots spring. The loss of the plants follows injury to the neck, and this may ensue from the skin being eaten by slugs or woodlice—these latter being very partial to them—or from dry-rot, though seldom from wet-rot. If the roots are lifted and placed where there are woodlice they are sure to be injured. This may occur under trees or hedges. If stored in a dry shed they perish with dry-rot, and if stored outside they are injured by frost. The best thing for the amateur is to leave them in the ground. The tops should be cut off low down, and when quite dead lowered still more, so that the cut or broken parts may be quite covered with soil. Otherwise woodlice and slugs will injure them, woodlice particularly. They enter the hollow stems and eat the substance out, and decay from we follows. If the above precautions are taken there will seldom be any losses.

Primroses and *polyanthus* may be divided and replanted.

Auriculas may be planted. These require a cool situation and a friable and fairly rich soil. The auricula is one of the most beautiful of hardy plants, thriving in cool surroundings only. It is not a plant for the warm parts of the Dominion, but is at its best in the coldest parts of the South Island, doing fairly well in Wellington Province, but failing farther north.

Gladioli bulbs of the autumn-flowering species should not be allowed to remain in the ground over winter. They should be lifted, dried, and stored in a dry place. It is well known that these species, which are all hybrids, are very liable to deteriorate, reverting to something like the original type. This is largely attributed to want of proper cultivation, and particularly to neglect of lifting and drying off, with its accompanying annual rest. This determination is observable in the large numbers of *gandavensis* of a brick-red colour that are extant. No one willingly cultivates them; they are simply reversions to the old type.

Borders are now usually subjected to a general cleaning up and clearing out. Most plants and shrubs require some restriction to keep them in their place to prevent overcrowding. Many require renewal of some kind to prevent deterioration. This is the case with many herbaceous plants, phlox of the perennial type, Michaelmas daisy, rudbeckia, helenium, &c. A rough way of doing it is to chop away the outside, leaving as much of the centre as is thought will be sufficient. That is the wrong way to do it. The outside growths are the youngest

and most vigorous. Chop out as large a piece from the outside as will suffice, dig out and destroy the remainder, and replant the young piece.

All *bulbous plants*, and others that die down to below the surface, should be distinctly labelled before removing the dead tops; otherwise they are likely to be injured or lost altogether. Often a man strange to the garden is employed to dig the beds and borders; he cannot know what is beneath the surface unless there is something to mark it. The very natural result is that many bulbs get turned upside down and are never seen again, or the crowns of *Dielytra* or *Solomon's seal* are cut off before he knows they are there. This leads to loss and disappointment, and frequently to false accusations of theft. Bulbs of lilies should seldom be disturbed if they are properly planted. They should be planted deeply, because, for one thing, they like to be cool and moist; another reason is that they make many roots at the base of the stems, immediately above the bulbs, and these require soil to work in. All the strong-growing lilies should be planted so as to have about 12 in. of soil above them. This indicates that the soil should be deeply cultivated and well drained, or the bulbs would be likely to lie in water during winter. *Lilies* seldom do their best the first year after planting; they take time to become established, and should not be disturbed until they show signs of deteriorating, which eventually happens, partly from overcrowding and partly because they get too near the surface, as increase is made in an upward as well as outward direction. Lilies require rich soil, and are benefited by liberal supplies of stable manure. Clumps of *Dielytra* and *Solomon's seal* may, if the soil is good and free in character, be allowed to increase to large dimensions. They do not become impoverished in the way that phlox does, and large clumps make an imposing display. A top-dressing of well-decayed manure mixed with good loam and wood-ashes will add to their strength. *Lily of the valley* having died down, remove the dead stems, and give a top-dressing of good loam and leaf-mould, with a little bone-meal—say, a 5-in.-potful to a barrow-load. Established clumps of *narcissi* may have a top-dressing of well-decayed stable manure, or a very light dressing of basic slag or bonedust.

Roses.—Continue to plant. When June comes in the bushes may be pruned before planting. There is no advantage in planting without pruning after autumn growth has ceased, and it is much handier to prune before planting than it is to prune the same bush in the ground, for there is danger of loosening its hold on the soil, as it has not the grip on it that established bushes have. Planting of all descriptions of trees and shrubs may be continued according as local conditions render it wise to do so. June is the dead month of the year, and in some places it is not wise to plant at that time. Everything, however, depend on local conditions.

THE POULTRY INDUSTRY.

F. C. BROWN.

JUNE is a slack month in the poultry year. Pullets hatched at the right time should be now all at the top of their laying-form, but the second-year birds, though perhaps looking well and apparently in a laying-condition, will not in most cases commence their second laying season till July. As a natural consequence egg-values may then be expected to decline. The fact that the supply increases all over the country in the months of July and August is an indication either that the bulk of the laying-birds are old stock, or that the pullets have not been hatched at the right time or to the best advantage. The three- and four-year-old bird will never prove a profitable layer, any more than will the late-hatched pullet. Both are unsatisfactory stock, not only from the viewpoint of egg-production but from a disease-resisting standpoint. It is unnecessary to here emphasize the mistake of keeping fowls beyond their second laying season; that they will never lay sufficiently well in their third season to show a decent profit over cost of production has been emphasized times out of number. After the second season a bird will only produce her eggs during the natural season, and thus not only provide a comparatively small number of eggs, but will give these when the cheapest markets rule.

Late-hatched stock are unprofitable, because in the first place the needful robustness is seldom or never secured, and thus the percentage of birds which must be culled is unduly high. They are also more subject to adverse conditions than the bird bred at the right time. It stands to reason that, hatched in the warm weather and coming on to the colder months before maturity is reached, the highly organized egg-type of pullet is called upon to face conditions which put too severe a strain on her, especially if she is not protected in every way from extremes of weather. I have of late had many inquiries with regard to colds, roup, &c., and in practically every case have been able to trace the cause to late hatching and absence of the special care demanded to enable such birds to combat those influences of nature antagonistic to satisfactory development they have been called upon to face.

I have repeatedly emphasized the fact that there is no satisfactory cure for well-developed disease in poultry stock. Prevention is the one thing to aim at; and the first thing to see to in this connection is that the bird has the necessary constitution to ward off disease should this unfortunately appear. In hatching stock late in the season disease is therefore openly invited.

INBREEDING.

While no great advance has ever been made in the improvement of type in domestic stock without inbreeding of the selected foundation animals, there are serious dangers following on the train of this method of fixing type, especially if the inbreeding is followed out without a definite method and aim. The danger is especially great with poultry, as there are very, very few breeders who know exactly the sire and dam of their breeding-pens. They may probably know the male parent, but seldom or never know the mother. We have yet to realize the great importance of studying the individual, be it cock or hen—having definite knowledge of pedigree of performance, knowing the exact relationship of the birds we mate, and thereby have some guarantee that the type we are aiming at will be secured. Unless we work on exact principles inbreeding will not only prove a delusion and a snare, but it will probably bring about a deterioration in the stock which will prove disastrous. I have seen birds which have been injudiciously inbred badly affected with vermin and a palpable prey to the first trouble that happens along, while in an adjoining pen were unrelated birds which were absolutely free of pests and as healthy and vigorous as one could desire. Again, when disease makes its appearance, especially tuberculosis, it will be found that the weak bird—weak because too closely inbred—will be a highly susceptible subject. To sum up the inbreeding problem, it should only be practised by those working on correct principles, who know just what they are doing, and who realize the paramount importance of maintaining constitution. To inbreed in a haphazard manner, as too many do, is simply to court failure and disappointment.

More than half the troubles being experienced are the result of inbreeding, not the inbreeding deliberately done with stock of which the true history is known, but that regrettable inbreeding arising from a want of knowledge of the stock being handled. This ignorance of the breeding-birds is too often not the fault of the breeder, but more the result of many of the small army of specialist breeders who, either designedly or unknowingly, do not possess an accurate knowledge of the strains with which they are working. For instance, I often receive requests for cockerels of a certain breed "to mate with hens of Mr. B——'s strain." As Mr. B—— has only Government stock, the inquirer is practically asking, in all innocence, for a related bird. We cannot know too much about the pedigree of the birds we desire to breed from. Unfortunately, the life of the domestic fowl is too short to warrant the compilation of stud-books, and the purchaser must perforce depend on a breeder's word as to a bird's breeding. This naturally tends to loose breeding methods, and thereby renders it a most difficult matter to place poultry-breeding on that sound foundation

so essential to the best results. Of course, judicious inbreeding is one of the chief secrets of success in advancing type, but it is a pitfall to the inexperienced, and even to the keen enthusiast is fraught with danger in the absence of the exact knowledge necessary to its successful application.

SOME DIFFICULTIES.

In asking for information in regard to several details of management, a subscriber raises some points of such general interest that it may prove instructive if I deal with them in this column.

Is it better to keep fowls in small flocks shut up in small runs, or large flocks on free range? is an old problem. Confinement too restricted is not good for any bird, and having a free range a small flock will do much better than in confinement, provided, of course, that where winter eggs are desired the birds have comfortable quarters and good scratching-accommodation in which they can shelter in cold and unfavourable weather. Of course, a small flock will always give a relatively better profit than a large one—indeed, it will generally be found that the greater the number of birds run together the lower will be the average return.

The use of a male bird is unnecessary unless the eggs are required for hatching purposes.

As to the desirability of providing grit as well as oyster-shells, some breeds will certainly do well on sea-shells alone. As a preventive of liver-troubles, however, sharp gravel grit is always advisable, and in the case of some of the heavier breeds it is essential.

There is no best-balanced ration. The most satisfactory results are obtained where a hen is allowed to balance its own ration, especially where the birds are of varying laying-capacity. Green stuff cannot be oversupplied, providing, of course, the birds are fed a sufficiency of other materials—a good warm mash in the morning (two parts pollard to one of bran) mixed with skim-milk or meat soup, boiled meat at midday (as much as the birds will readily eat up), and grain at night.

Providing the birds are of a heavy-laying strain, give them as much food as they can consume at each meal. No definite amount can be stipulated as to the daily supply for a flock of birds, as their appetites vary much according to the season, the weather, and the laying-condition of the birds.

To secure winter eggs the object should be to breed birds at such a time and manage them in such a way that they will not go into a moult during the pullet stage. To get winter layers to commence in the month of April, light birds should be hatched at the end of September, and the heavier birds a month earlier. Of course, some strains mature earlier than others, and this should be allowed for.

As a general rule, a White Leghorn commences to lay at six months old, and the heavier breeds at from seven to eight months. To force to maturity is always a mistake.

THE BREEDING-PEN.

Another correspondent wants to know if it would be a safe course to put three roosters with forty hens in a breeding-pen. This method would be productive of satisfactory results if, providing a good range were provided and the management were sound, all the hens were of the one type. Then, nature's selection being at work, good vigorous stock would probably result. If, however, there be any variation in the type of the hens the results would be very uneven, and only a percentage of the progeny would be up to the desired standard. Mating birds demands great care on the part of the breeder. It is not always possible to bring birds together which will nick with each other, but the breeder can certainly bring about some improvement in type in the process of mating by using a female which is strong where the male is weak, or *vice versa*. Such safe methods of eliminating weaknesses and strengthening desired characters cannot be left to nature. They can be controlled by human will; and, indeed, the remarkable development of all our races of domestic stock is mainly due to man's interference with nature to the extent of selecting the animals he mates to secure a given ideal. Say you have a cock bird which is built just after your conception of what you require, but he is a little on the leggy side. He may be the best bird you ever owned but for this weakness. Would you not select hens to mate with him which are all low set, rather than putting leggy birds to him and thereby exaggerating what should be minimized? Few of the types which will have any influence in raising the standard are to be found even in the best flock in the country, and therefore the very greatest care should be taken in selecting the breeding-pens. It is a much safer policy to have too few birds in the breeding-pens than too many.¹

THIS YEAR'S STOCK OF THE POULTRY PLANTS.

It is gratifying to be able to report that the young stock of this season on the poultry plants of the Department is of a very good standard. The progeny of the utility birds imported from Australia last year are particularly attractive. Certainly all the birds are not everything that could be desired, but it is never possible to secure the ideal aimed at all at once. For instance, the Black Orpingtons, of capital utility build and correct specimens of the breed, are a little more open in the feather than I would like. By next season, however, it is hoped this defect will be eliminated from the second generation by corrective matings. The White Orpingtons, while of a greatly improved

type to the old stock—from both utility and breed viewpoints—have not that desired, but difficult to attain, brilliancy of white in the colour of the male birds. The stock of the White Rocks is the best of the progeny from the imported blood. In utility points, breed characters, and trueness of colour they are excellent. They have the absolutely true build of a Rock, not the close resemblance to the Wyandotte form which characterizes so many White Rocks in this country. The Rock form is absolutely distinct from that of the Wyandotte, or even the Orpington, having the oblong tapering body with the main development where it should be, quite distinct from the more blocky low-set type of the latter breeds. The White Leghorns have thrown very satisfactory stock, exhibiting splendid utility qualities combined with good breed points, and fair size of body. It was unfortunate that the male bird of the Redfern trio failed to become properly acclimatized, which affected fertility and limited the number of stock produced. The Minorca stock is the type of the breed I have long desired to see established on the plants—the original utility bird, having the necessary breed characters without extreme fancy points. It resembles very much the noted strain of utility Minoreas being bred at the Ruakura Farm of Instruction. While only females of the White Wyandotte breed were imported, these have nicked well with the Department's strain, and the progeny is of a satisfactory standard. Unfortunately, fully 75 per cent. of the progeny of the imported birds are males.

A decided change is noticeable in the requirements of patrons of the poultry plants. Formerly birds displaying utility characters alone were asked for; now a bird combining both breed and utility points is desired. No doubt this gratifying view has been largely brought about by the wise decision of poultry-show societies to include classes for utility stock in their exhibitions. While the Department aims at producing stock which possesses utility characters as the first essential, it takes every care to maintain desirable breed points. Unfortunately, many people expect the ideal breed and utility types in the one animal—almost a freak in nature. The Department cannot undertake to meet this demand. Its object is to provide profitable purebred stock for the producer, and, as the highest price charged for a bird is 10s., it cannot undertake to furnish exceptional animals suitable for the show-pen.

Owing to the greatly increased demand for sittings last year many orders could not be executed with the desired promptitude, while a good number of orders could not be fulfilled at all. In view of this fact, and in anticipation of a still greater demand this season, breeding-pens have been largely extended, and all the best forward pullets are being retained to strengthen the breeding-stock. Under the circumstances only a very limited number of pullets will be available for sale until the breeding-pens are finally made up. Cockerels of all breeds

can be supplied at 5s., 7s. 6d., and 10s. per head, according to selection, coops being extra—one, two, or three birds, 2s.; every additional bird, 6d. Early application for both birds and sittings is necessary, in order to avoid delay and possible disappointment. Owing to difficulty of collecting small accounts it has been decided that the cost must accompany all orders.

LINE BREEDING.

The value of inbreeding and the necessity of only doing this on definite principles suggests the necessity of providing for readers of these notes a definite method of procedure. I cannot do better than quote Lewer Wright's exposition of the method of line breeding devised by the American authority J. K. Felch. This is as follows:—

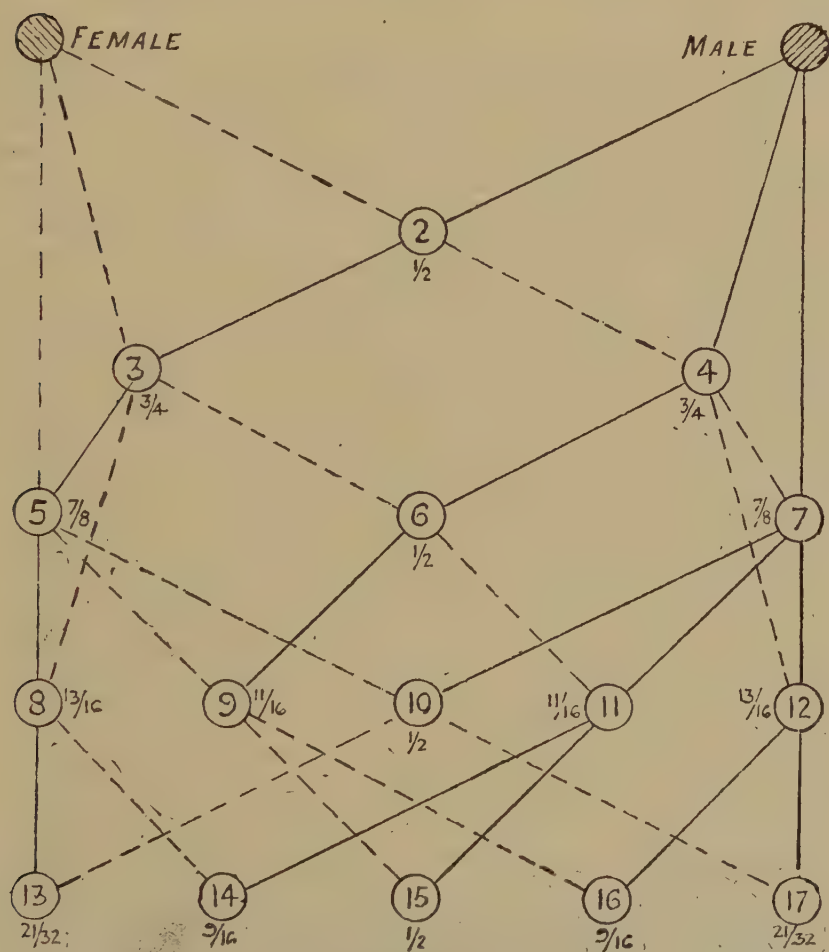
Suppose the strain to originate from two individuals only, though in the case of fowls, of course, several hens or pullets might be used as one of the units. In that case, however, all should be of the same breeding.* The two original units must, of course, be perfectly vigorous and healthy, and either unrelated or only distantly related in blood. They should always be from different yards, for it is found that even change of ground has some effect in producing that "different blood" which has so much to do with avoiding constitutional disease. Taking our two original units, then, Mr. Felch's chart shows how they may be bred so as to maintain health and vigour.

In reading this chart every dotted line means a female—i.e., a hen or pullet—and every unbroken line a male. Wherever two such lines meet at a point, the circle at that point denotes the produce of the mating, bearing a number distinguishing it as a group or product; while the fraction outside the circle denotes the mixture or proportion in that product of the blood of the two original units from which is bred the strain. The first year, for instance, the original pair produce group 2, whose blood is half-and-half of each. The second year the original female, or one of them, is bred to a cockerel from group 2, and the original male to a pullet from group 2. Thus are produced groups 3 and 4, each of which possesses three-fourths of the blood of the unit on its own side of the diagram. Here begins the real work of the breeder, since these mates now taken from group 2 must be most carefully selected to type, according to that "course of selection" which we have already discussed. From the very first all depends upon this, and, of course, the two original units have been chosen with equal care, so far as money and opportunity allowed. The third year a cockerel from group 3 is mated with the original hen to produce group 5, and pullets from group 4 to the original male to produce group 7, all of which possess seven-eighths of the blood on their own side, and are to be rigorously selected true to type as before.

But the most noteworthy mating this year, to which we would call special attention, is that of a pullet or pullets from group 3, with a cockerel from group 4, producing group 6. It will be seen that all the members of group 6 possess equal or half-and-half blood from the original parents, as much so as group 2. We also mate a pullet from group 5 and a cockerel from group 7, each of these owning seven-eighths of the blood of one ancestor, and we again produce in group 10 a progeny whose blood is half-and-half. Now, suppose we had mated brothers and sisters from group 2 to produce the half-and-half blood and age of group 6, and brothers and sisters from these to produce similar equality of blood at the age of group 10, the result of such incestuous inbreeding would have been swift degeneracy. As it is, we have made our matings from lines characterized mainly by the original male and female, and yet preserved the same mathematically exact equality of blood in our group 10. A generation further on we can produce group 15 as shown, from groups 9 and 11; or we might have mated groups 8 and 12; or the produce of the former may be mated with that of the latter. We have thus seen how it is possible to keep up the half-and-half blood of a cross intact and exact without any loss of size, fertility, or vigour.

*It need hardly be pointed out that in this case the scheme may be carried out with less inbreeding at the first stages, as a cockerel might be bred back to an aunt instead of to the mother. But unless the hens or pullets are full sisters the result will not be the same or have the same certainty.

We also see plainly from this chart that by the time we have reached the stage even of group 10 we have got in our hands practically *three strains*; for while group 10 possesses equal blood of both sides, group 8 has thirteen-sixteenths of the blood of the hen, or practically represents the female line; while group 12, in like proportion, possesses the blood of the male line. Yet all are related sufficiently to prevent evil; and all have gone through the same "course of selection" towards our own fixed type. From this point we have ample material to go on with indefinitely, and need not pursue that matter further. The bottom row of groups simply shows some of the



FELCH'S CHART.

results in the next generation. But one point more may be illustrated. Suppose that for some reason—as for special cockerel or pullet breeding—we want to establish also a line of sires in which predominates the blood of the original female. The chart shows a cockerel from group 5 mated with a pullet from group 3, and a cockerel from the produce in group 8 mated with a pullet from group 10. The result in group 13 gives us the same proportions of blood, but derived through a cockerel line of breeding.

Whenever a cross is necessary in a strain, such a chart also shows the procedure that should be followed. The cross is treated as a new unit, and its produce remated

back to the home strain in the same way, carefully selecting for the desired type as before. This is what breeders and fanciers term "breeding back" to a strain, and the philosophy of it can be clearly understood from such a diagram as that before us. Every cross thus involves more or less breeding back to the "line" afterwards; but this need not be carried to the extent of incestuous matings, or interfere with vigour in any degree. The out-cross is not used as immediate material, but to provide either pullets or cockerels for really breeding into the strain the following year.

THINGS TO REMEMBER.

Strong, healthy birds are the most difficult to catch in the run.

Maize-meal, pea-meal, or maize and peas fed whole may be used with advantage in cold weather.

The moulting bird should have an abundant supply of nourishing food. It is poor policy to neglect the heavy layer when temporarily out of action.

Get rid of all surplus cockerels. They will give a better return if marketed at five months old than at a later age. Study the cost of production.

If the winter-egg yield has been unsatisfactory this season, now is the time to arrange matters so that winter eggs will be in abundant supply next year. Hatch good stock at the right time.

One breed is enough for most people to deal with, if the flock is to be bred and managed to the best advantage. One breed may be studied successfully, whereas two may be studied but indifferently.

Don't adopt new and untried methods. There are no get-rich-quick systems of poultry-keeping. Common-sense and hard work are the mainsprings of success.



POULTRY SECTION AT RUAKURA FARM OF INSTRUCTION.

PASTURES AND CROPS.

APRIL.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month :—

BAY OF ISLANDS.—The disastrous drought continues, this now being the seventh month since any appreciable rain has fallen. The troubles of the drought were supplemented by several severe frosts, which chilled the air and cut down all sorts of vegetation, on the nights of the 5th, 6th, 7th, and 8th. Since those dates the nights generally have been very much colder than is usual at this time of year, and farmers have found it necessary to cover their horses at night, even in this "congenial" northern climate. These severe frosts have caused farmers and stockowners to become very despondent. The winter outlook has never presented more discouraging prospects, as the number of stock in the north is greater, and fodder and grass is more scarce. Consequently farmers have found it necessary to sell a lot of their stock at a sacrifice. Fires are still raging in some localities and destroying the remainder of the already parched pastures, and many acres of useful bush, which farmers have hitherto depended on to a considerable extent to help them over the winter as places providing rough feed and a refuge from the bitter wintry winds. Stock of all kinds are showing signs of impoverishment and sickness in many localities. A good many losses have been reported, and one small farmer has lost nine head of his young heifers, due to eating the young shoots of fern which have sprung up since the bush-fires. Others again have met their fate by getting into many of the swamps after a more verdant forage, and, being in a weak state, have been unable to struggle back to dry land. Farmers are becoming resigned to the gloomy prospects which the North has never experienced in the past, and most of them realize the value a good ensilage-stack or a good stack of hay would be at this juncture. It is on these occasions that the far-famed *paspalum* can prove its worth as a drought-resister, especially on those rich alluvial flats that are found in many valleys of the North. A slight rain fell yesterday, but quite insufficient to meet the demand of the baked-up soils.—*W. J. Dunlop.*

WHANGAREI.—On the 7th and 8th of the month we had two severe frosts. The drought continued until the 26th, when warm rains fell till the 27th; in all, the rainfall amounted to a little over 2 in. This rainfall has given the pastures a fresh start, and, should warm weather continue, with a little more rain, it means an abundance of grass well into the winter. This has been the driest season in the North for many years, and the rain means a matter of thousands of pounds to this part of the Dominion. There has been a big loss throughout the district from bush-fires, and most of the settlers having sown grass-seed too early, in the majority of cases this has been a total failure. The only grass the drought did not affect in the slightest was *paspalum*; this continued to grow until the frosts came, and then the growth practically ceased.—*A. P. Siedy.*

AUCKLAND.—Fine warm weather continued up till the afternoon of the 3rd instant, and then a change took place, rain falling on and off at intervals up to the 7th, when it turned very cold and windy, after which a few fine days followed. On the 14th heavy rain set in again, which was much appreciated after the spell of dry weather. However, the rainfall did not last long enough, and was not sufficiently heavy to saturate the ground thoroughly. From the 15th to the 24th it kept fine, but very cold and frosty nights were experienced, which greatly affected the growth of everything. The dairying industry suffered from the effects of the dry weather through this cause. There was a considerable shortage of milk, somewhat greater than usual for this time of year. Considering the shortage of feed, stock of all descriptions are in fairly good condition. The green crops in most places are very good, and the rain now setting in again will give them a fresh life. The growing crops of potatoes that looked promising last month suffered considerably from the effects of the frosts. Judging from reports they are practically ruined.—*R. Rowan.*

KIHIKIHU.—Although the weather for April might be characterized as almost perfect, there was a lack of warm rains to aid the autumn-sown grass. Pastures also suffered from high winds and frosts, consequently the dairy-farmer is feeling the result in diminished milk-yields. Hay is being saved in larger quantities than during the last two seasons, and this, combined with a splendid root crop, ensures the future of the backbone of this district, the cow.—*C. E. McPhee.*

THAMES.—Owing to the continued dry weather, matters are looking serious for the dairy-farmers. Although a splendid rain was experienced on the 29th of March, the recent cold weather has retarded all autumn growth, and the winter will be here before there is any chance of recovery. We had rain again on the 14th of this month, and it is raining to-day while writing this, accompanied by a cold east wind. Potatoes just harvested are a good crop and are free from blight.—*George Rigg.*

TE AROHA.—The weather was dry during this month; on the 14th and 26th, however, there were two nice falls of rain, which were most beneficial to pastures and root crops. Owing to the continued drought the ground is still hard and dry, particularly in part of the Bay of Plenty district, where the pastures are looking bad, and unless some good rains come, with some warm weather, matters will be serious for settlers, as in many instances no provision for winter feed has been made.—*J. R. Morris.*

HAMILTON.—Light rains fell on two days during the month of April: these, with heavy mists, kept the pastures green and fresh, although the growth has been checked by three frosts. The root crops are looking well. The land has been, and is, in good order for cultivating for autumn cropping. Stock are looking remarkably well, dairy herds especially so. By reports from other districts, Waikato has been particularly favoured as to weather-conditions, pastures, &c., this season.—*J. Kerr.*

KING-COUNTRY.—April was a dry month, the weather being more like summer in the daytime, with cold nights approaching a frosty temperature. These conditions, whilst being favourable for all late soil-cultivation, have been severe on the pastures, which are now very bare of feed for this time of the year. Young grass and turnips sown on bush burns have also received a check. A warm growing rain would now be very much appreciated throughout the district.—*B. Bayly.*

TAUMARUNUI.—April was a very favourable month, with light rains during the earlier part. Fine days, with a few light frosts at night, have not done any harm. Winter feed is secure. Turnips on bush burns have come away well. Factories are still receiving ample supplies of cream, and are likely to continue getting it for some weeks longer.—*E. T. Hughes.*

OHAKUNE.—The month opened fine, and continued so until the 7th, when light rains occurred accompanied by very cold winds, with snow on the higher levels. This sample of weather again repeated itself on the 14th and 15th, and from this period to the end of the month exceptionally mild weather prevailed. Pastures, according to situation and elevation, were more or less affected by the occurring frosts, present appearances pointing to a hard time for stock on areas overstocked and where provision has not been made for winter feeding. The milk-supply within the month has considerably decreased, and for winter distribution the supply is hardly equal to the demand. Oats, where chaffed, have been productive of good samples, particularly so are Gartons, this variety in general being well headed and not overburdened with too much straw. Satisfactory yields of potatoes have been obtained, Gamekeepers and Northern Star appearing more suitable than other varieties to the climatic conditions of the district.—*D. Barry.*

TAIHARU.—The weather during April was anything but satisfactory from a farmer's point of view. Owing to the absence of warm rain the pastures are very backward. Stock throughout the district are looking very well indeed.—*A. P. Smith.*

NEW PLYMOUTH.—Owing to a fall of snow on the 5th, which covered the mountain and the tops of the ranges, the weather became much colder. Little rain has fallen during the month, the days being very bright and fine, with an autumnal feeling in the air. The country is looking remarkably well, and feed is plentiful. Some of the turnips are being fed off owing to the bulbs rotting. Mangels are looking well. The autumn-sown grasses and crops are making good growth.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—With the exception of the 7th and 8th, when we had a heavy southerly rain, April was a fine month, with frosty nights and clear bright days. The disease that has broken out in the swede turnips will be a serious thing for the farmers in the district, as the turnip is the main crop for the dairy-farmer. In many cases the farmers have had to turn their cows on to the crops, in order to get some feed before they all rotted. So far, the later crops sown on new ground appear to be clean.—*Austin F. Wilson.*

HAWERA.—Very rough boisterous weather was experienced early in the month, with an unusually cold snap on the 7th and 8th. Since then the weather has been changeable, with light misty showers at times, cold nights, and a few slight frosts followed by bright sunny days. A good soaking rain would be very beneficial just now, as grass is getting rather short, and the pastures in some parts of the district present quite a burnt-up appearance. There are indications that farmers who have not laid by a good store of hay or ensilage will be short of feed during the coming winter. The grass-grub is in evidence in some parts of the district, but not to any serious extent. Root crops are looking well, but will not be as good as last year's crops. The end of the dairying season is now approaching, and, although perhaps not up to expectations warranted by returns in the early spring months, farmers generally appear to be well satisfied with the season's operations.—*A. J. Glasson.*

WANGANUI.—The chilliness of the weather during April was a decided intimation of the proximity of winter. With the exception of the last few days, which were appreciably milder, the temperature was generally low, and several frosts were recorded. Very little rain fell, except on the night of the 13th and the dawn of the 14th, when there was an unusually heavy downpour. Feed in the pastures, although the growth was checked by the low temperature, is still plentiful, and during the last five days of more genial weather is showing noticeably green. Roots and green crops are doing fairly well.—*C. Watson.*

MANGAWKA.—Weather-conditions during the past month were too dry. Several light showers fell, but not sufficient to soak the ground; therefore the grass is not so far advanced as farmers would like to see it. The good prices offering for all classes of stock tend to prevent overstocking, so that graziers will have a better chance of carrying the remaining animals well through the winter. Some of the turnips and grass on the new burns look very yellow and sickly, due to want of rain. This means a decided loss to new settlers, as a good crop of turnips ensures a considerable profit to beginners in this district during the coming winter.—*J. A. Melrose.*

FEILDING.—The present month was cold up to the 20th, which checked the growth of grass considerably; since that date it has been mild for the time of the year. Oats that are sown and are above ground are looking well. Some farmers have made the mistake of not getting their stubble land ploughed earlier in the season and letting it lie up to the sun. Threshing operations have been in full swing. Oats, barley, peas, and grass-seed have turned out well. Silver-beet, or Swiss chard, has been sown in this district, and is giving very fair returns; but when planted under more favourable conditions experimenters will beyond doubt be pleased with the results obtained from it for fattening purposes.—*W. Dibble.*

GISBORNE.—Very serviceable rains fell during April. Pastures are now showing a good improvement, although the growth has been retarded by the cold winds and frost that accompanied the rain. Cattle-feed will be short during the coming winter over the whole of the district. Maize-picking is now being carried out. The yield will not be as heavy as last year, owing to the dry season.—*W. Ross.*

WAIROA.—The weather-conditions during the past month were of a variable character. The first portion was wintry and broken, while the latter half was of a mild nature, thus producing a spring-like growth of the pastures, a condition of affairs that will be greatly appreciated by the pastoralist, as there has been a great shortage of grass throughout the past season. Stock are not up to the normal in point of condition.—*T. F. Mullaly.*

WAIPIKURAU.—The month of April has been an ideal one as far as weather-conditions are concerned, it being more like spring than autumn, nice warm rains falling at intervals, with sunny days following. Pastures and root crops should be much benefited. Should the frost keep away, winter prospects will be very much improved. Autumn-sown grasses are coming away well.—*H. O. M. Christie.*

PAHIATUA.—The rainfall for the month was 2.30 in. Rain fell on eleven days, the heaviest fall being on the 13th. (April, 1912: Total fall, 5.44 in.; rain fell on sixteen days; heaviest fall, 1.61 in., on the 27th.) We again have had good weather for all outdoor work, and this has been taken advantage of throughout the district. The root crops that were put in late are still growing, and are making fair headway. Chaff-cutting and threshing are now being started, some being last year's crops. The crops generally in both cereals and roots will not be up to the average. This remark applies generally to the crops that were put in late (the lateness was owing to bad weather, followed by high winds and gales). The outlook for the coming winter is good at present.—*T. Bacon.*

NORTH WAIRARAPA.—The past month was exceptionally fine. At the beginning of the month we had light rains, and towards the end a few nights' frost, with fine sunny

days, which should tend to freshen up all pastures. There is a fair amount of autumn feed sown, and it is looking well. Probably there is more sown this season on account of the turnip crop being a partial failure. There is a fair amount of ground ploughed, and farmers are taking advantage of the fine weather to work their ground and thus destroy the weeds. The milk-yield is decreasing, as is to be expected at this season of the year. Stock, however, are looking well. I notice stacks of ensilage dotted throughout the district.—*J. S. Rankin.*

WELLINGTON.—April opened rather unpromisingly, with blustering gales and rain, but towards the middle of the month a welcome change occurred. Up to the 29th, beautiful, calm, warm days were the rule, with slight frosts inland. Full advantage was taken of the calm spell to push on with all farming-work. Pastures are excellent for the time of year, and autumn-sown crops are coming away well. All descriptions of stock are doing satisfactorily.—*G. H. Jenkinson.*

BLENHEIM.—At the commencement of the month there were two or three hard frosts, after which the weather was fine, rain being badly needed. Strong gales of wind were experienced about the middle of the month, doing a good deal of damage in parts of the district to property, trees, hay, and corn-stacks.—*F. H. Brittain.*

WESTLAND.—The month of April was somewhat more pleasant than for some considerable time past; but, being late in the season, there is not much likelihood of continual fine weather, although the winter months on the West Coast seem as a rule to be more settled than in summer-time, the days being fine and bright, with cold frosty nights. This, however, does not apply to every season, and rain takes the place of fine weather for the greater part of the year, which is a considerable drawback to those on the land, hindering them in every possible way from following their pursuits to the best advantage.—*H. J. Walton.*

KAIKOURA.—Pastures are still good, and there is sufficient feed about for stock. Autumn-sown oats for green feed and root crops for winter feed are coming on well. We had three or four fairly sharp frosts about the beginning of the month, but these did not check the growth of grass. Throughout the month ideal late autumn weather prevailed.—*W. S. Goodall.*

ROTHERHAM.—The weather during April was somewhat mixed. During the first few days there was heavy rain, with snow very low down on the ranges. Then very severe frosts were experienced, and these were followed by mild weather, which was most favourable for all kinds of green feed and for pastures. Farmers are now busy getting their crops in. A large area is to be put under wheat and oats this year. Threshing operations are almost completed. Yields, upon the whole, are poor. On the Cheviot Settlement one farmer had a paddock (12 acres) of Pearly White wheat, which yielded 60 bushels per acre—a record for the district. Potatoes are now being dug, but yields are poor. High prices are ruling for fat lambs and also for young ewes.—*W. M. Munro.*

RANGIORA.—April was a very calm month, but there were two strong north-west gales during the second week. The rainfall was 1.96 in. There were three slight frosts during the month, and a heavy one of 5° on the 9th. There are still a lot of potatoes to be lifted. Crops are not as large as those of last year. I have had several inquiries about silver-beet, and I think there will be a big demand for seed next year owing to its being able to resist the frosts.—*A. Hughes.*

LINCOLN.—The weather during April was, generally speaking, cold for the time of year, but there were also a few really beautiful days. A good rain fell on the 13th. Throughout the month plough teams were busy, and farm-work is well advanced. A fair acreage is now almost ready for the sowing of wheat and barley. Potato crops are being dug, and in some instances are yielding well. Turnips will provide a fair amount of winter feed, but in places have suffered from the diamond-back moth. Feed in the pastures is still fairly abundant, though much of it now is very dry.—*J. G. Scott.*

ASHBURTON.—Splendid weather was experienced during the month, only 1.75 points being recorded, as against 4.16 for the corresponding month last year. Sheep have fattened well. Very little snow is on the ranges. In the back country the farmers are now mustering, to put their sheep on safe country. The sheep are being brought in in excellent condition.—*C. Branigan.*

FAIRLIE.—A fine open month; everything doing well. Farmers are making good use of the good weather, and a deal of autumn sowing has been done. There appears to be a shortage of draught horses in this district. At a clearing-sale recently held, horses from eight years old and upwards realized £40 and over, yearlings up to £25, and foals up to £12. Cattle are bringing good prices, especially young animals, yearlings being sold up to £3 11s., and fat cows up to £9 10s.—*W. B. Manning.*

TIMARU.—During the month there was a fair fall of rain, with a lot of foggy weather and very little frost. There is a good growth of grass all through the district to start the winter with. A large amount of cow-grass has been cut and stacked, and some which has been threshed has yielded well. Potato-digging is general, but there is only a fair crop.—*J. C. Huddleston.*

WAIMATE.—The weather during April was very changeable, and at times exceptionally cold for this season of the year, rain somewhat hindering threshing operations. Pastures all through the district are looking well. During the month a considerable area was broken up for cropping. Cereal crops are not threshing out up to the average, and potato-yields already dug are not so heavy as usual. Turnips and mangels look well. Lucerne and maize, on the other hand, have suffered considerably from the unseasonably cold weather during growth. Silver-beet and chou moellier sown last month are doing well. All stock look well, and there is for this time of the year an abundance of feed.—*F. A. Macdonald.*

KUROW.—We have had beautiful autumn weather during the past month, and the frosts have not been severe enough to retard growth to any extent, with the result that pastures are looking splendid, and stock of all kinds are in good heart to face the winter months. Potato crops are not so good as last season's, although they are free from disease. Threshing is still going on in the Hakataramea Valley, crops not yielding quite so well as last year.—*G. Reid.*

OAMARU.—The weather has been fine, with cold frosty nights, and in most cases was very suitable for the farmer. The rape crops are not good throughout the district, but green winter feed is doing well. Threshing is mostly over, and ploughing and carting grain is the order of the day.—*W. F. Flower.*

PALMERSTON SOUTH.—The weather was fairly good throughout the month. The rainfall since the 28th March was 141 points. Splendid weather has been the rule since the 18th, there being unusually high barometer on the 20th and 21st, slowly falling ever since, and very cold for the last two days. There were several hard frosts throughout the month. Ploughing and preparing the land for autumn sowing is the chief work being done on the farm. Pastures and green feed are looking well. Root crops have a good show of tops, but with small bulbs.—*C. S. Dalgleish.*

DUNEDIN.—The weather during April was very mild and sunny, quite a contrast to that experienced in March. This has enabled farmers to lift their potatoes, which have turned out a fair crop. With one or two rare exceptions, mangels are a very light crop. Pastures still continue fair, and winter feeding will not be such a big order as it has been in past seasons.—*J. R. Renton.*

MOSGIEL.—During April it rained for eight days, doing good to the hill country. Harvesting is practically over. The yield will be much lighter than last season. Farmers are busy ploughing, and the land is in exceptionally good order for breaking up. Potatoes are not yet lifted, but the yield will be light. Pastures, turnips, and mangels are looking well, and there will be abundance of feed for the winter. Very heavy rain fell on the 30th.—*H. A. McLeod.*

STRATH TAIERI.—The weather during the month was changeable, with every appearance of an early winter. During April we have had three wintry snaps, which whitened all the surrounding hill country. Pastures are fairly good, and stock are in fair condition to start the winter. Potato-digging is general, and in most cases the crops are light. In some localities late turnips have come on well. The land is in good condition for ploughing, and most farmers have made a start.—*W. Scott.*

MANIOTOTO.—There has been a good deal of frost during the month. Up to the 13th the weather was changeable; since then we have had fine clear days, accompanied by frost at nights. Stock throughout the district are healthy and are in good condition.—*A. T. N. Simpson.*

LAWRENCE.—The first portion of the month was very cold and stormy, with snow on the hills and also lower down; but much more favourable weather was experienced at the latter end of the month. Harvesting is almost completed, with the exception of a few late places. Yields of all grain are light. Turnips will not be a heavy crop. All stock are looking well at present, and, should the winter be not too prolonged, there will be sufficient feed to pull them through successfully.—*R. Barron.*

BALCLUTHA.—The weather for April was very changeable—considerable rain and a few sharp frosts, with latterly ten days of lovely weather. Winter feed for stock will be very limited (chiefly on account of the recent floods), as a considerable area of good turnip crops have been ruined. This applies chiefly to Barnego and Inch-Clutha. The

latter place is noted for its root crops, and in past seasons hundreds of cattle have been winter-fattened there. This season the number will be very small. All stock are in fair condition.—*Hugh A. Munro.*

OWAKA.—Good weather was experienced in April, which enabled the farmers to get their crops stacked. The mills are now at work, and most of the yields are satisfactory. Turnips have done well, and there are some extremely nice crops to be seen. The potatoes are of fairly good quality, but the returns will not be heavy. Grass is holding out well, and there is a lot of rough feed for the winter.—*R. McGillivray.*

LUMSDEN.—During the month of April extreme conditions of weather were experienced. The first week exceptionally heavy and continuous rain fell for a couple of days, and the most severe flood on record in this district resulted. During the last fortnight the weather has been very good—clear, warm, genial days allowing the farmers to renew their harvesting. Turnips have suffered by the recent floods. The yield of oats and wheat will be light. A sharp shock of earthquake was felt on the 26th.—*W. S. S. Cantrell.*

INVERCARGILL.—The weather during the past month was changeable. Towards the end of the month there was a week's fine weather, which gave farmers an opportunity of getting in a good amount of crop. A few more fine days and the last of the grain should be gathered. There have been few frosts during the month. Although grass is getting scarce just now, the turnip crops are good. Potatoes promise well, being fairly free from blight.—*J. R. Whyborn.*

OTAUTAU.—The weather for the month was an improvement on that of the previous month. Some fine sunny days were experienced, also a few heavy frosts. The pastures are not feeding as well as might be, owing to their washy nature. Harvest is not yet finished, though farmers are availing themselves of every chance. Threshing is in progress, the yields not being up to previous years. Turnip crops are not showing as well at the bottoms as was expected by the top growth. Potatoes are being dug, and some good yields have been obtained. These are fairly free from blight.—*H. F. Dencker.*

QUEENSTOWN.—The weather was somewhat broken at the beginning of the month and up till about the 12th. Nice settled weather, with light frosts at night and beautiful sunshine during the day, prevailed since that time. This was welcomed by the farmers, as quite a number had crops still in stock, and in some cases these have yet to be cut. Turnips and potatoes are turning out fairly good, and feed for winter promises well.—*A. Clarke.*

PEMBROKE.—The weather-conditions during April were very unsettled. The first week was very cold and stormy, and several light coverings of snow fell on the higher country. The second week was much milder, and farming operations were less difficult to carry out. Cold stormy weather was again the order for the next few days, after which the frosts became more marked, with the days bright and sunny. The winter outlook at present appears bright. There is no shortage of feed. Winged thistles are very plentiful.—*J. A. Griffith.*

THE FRUIT CROP.

THE officers of the Orchards, Gardens, and Apiaries Division report as follows on the condition of the fruit crop at the end of April:—

WHANGAREI.—Apples, only very late varieties; lemons, fair to medium; pears, nearly finished; oranges, falling badly on the volcanic soil, especially sweet varieties.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, late varieties only, good crop; lemons, looking well, good prices; pears, good crop, nearly over; tomatoes practically finished.—*W. C. Thompson.*

AUCKLAND SOUTH.—Apples, only late varieties left, fair crop; pears, almost done; nectarines, crop finished; peaches, crop finished; tomatoes, nearly all done, now being cut by frost.—*N. R. Pierce.*

HAMILTON.—Apples, fair crop of late varieties, rather damaged by late flight of moth; lemons, still very scarce in markets; peaches, crop all harvested; pears, crop all harvested, prices good; tomatoes, crop practically finished; walnuts, very light crop; early frosts have destroyed outdoor crops.—*T. E. Rodda.*

POVERTY BAY.—Apples, below average, may expect shortage of sound apples during the winter; lemons, poor; pears, good, but not keeping well; walnuts, good average.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, medium crop, late varieties good, and less scab than earlier varieties; pears, taken on the whole, a very clean crop; tomatoes, average crop, clean, will soon be over for this district; walnuts, fair crop, attacked by bacteriosis in some parts of district.—*G. Stratford.*

WANGANUI.—Pears, crop average to heavy being harvested; plums, crop harvested; plums (Japanese), crop harvested; tomatoes, crop done.—*W. C. Hyde.*

HASTINGS.—Apples, supplies not too plentiful, quality very good; pears, late varieties good, free of scab; tomatoes, exceeded expectations, season over; walnuts, fairly good crop.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop, cooking varieties looking well; pears, average to heavy crop, scab prevalent; tomatoes, average crop, slightly damaged by frost.—*T. C. Webb.*

BLENHEIM.—Apples, medium crop, season almost over; lemons, good crop; pears, fair average crop, season almost finished; tomatoes, good crop, two or three severe frosts destroyed all fruit that was not picked; walnuts, heavy crop, harvesting in full swing.—*B. G. Goodwin.*

NELSON.—Apples: All early and midseason varieties now gathered, and growers are busy getting in the later ones. Sturmers mostly being cool-stored; Jonathans have turned out well, but supplies of this variety are now getting short. Heavy wind blew on the 20th instant, bringing down hundreds of cases of fruit; in one place a grower picked up some 500 cases after the blow. Pears, now all picked, and supplies are getting short, a fair quantity have been placed in cool-store; tomatoes, still a few, but sharp frost early in month spoiled most of them and growers are now clearing up their areas. The apple shipments to South America for the month totalled 14,849 cases. All stone-fruit is now finished.—*J. H. Thorp.*

CHRISTCHURCH.—Apples, good crop, turning out well; pears, good crop, harvesting well; tomatoes, heavy crop, a few still being picked; walnuts, light.—*W. J. Courtier.*

TIMARU.—Apples, late keeping sorts now being picked, fair crop of Sturmer Pippins; pears, late keeping varieties being picked, good crops of Winter Cole variety; walnuts, a splendid crop of nuts has been gathered, and are realizing good prices.—*A. B. Mansfield.*

DUNEDIN.—Apples, main crop being picked; peaches, a few late varieties still picking; pears, later varieties being picked; strawberries, large area being planted for next season; tomatoes, over; walnuts, being harvested.—*W. T. Goodwin.*

LOSSES TO APIARISTS IN SOUTHLAND.

THE recent disastrous floods in Southland were responsible for heavy losses to the beekeepers. Quite a number of apiaries have been almost completely destroyed, those situated on the river-banks suffering most. Messrs. Allan and Graham's Maitara Island Apiary, numbering fifty-two colonies, was swept away, but the owners were fortunate enough to recover ten stocks which had drifted against a live hedge. Mr. H. Winslade, Willowbank Apiary, Kelso, was also a great loser: out of sixty colonies only fifteen remain, the rest being carried away by the rising in the Pomahaka. Reports have reached me of further losses in minor apiaries, but I have not as yet received full details. The flood of 1913 will long be remembered by the beekeepers of Southland.—*E. A. Earp.*

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of April:—

AUCKLAND.—The rush of the season is now over, and supplies are slackening off daily. Owing to continued dry weather in the North, many of the later varieties of apples are small and scrubby, but the demand is fairly keen and prices are holding well. Apples—choice dessert, 6s. to 8s. per bushel; seconds, 4s. 6d. to 6s. per bushel; cooking, 4s. to 5s. 6d. per bushel; Northern Spy, 8s. to 11s. per bushel. Pears—choice dessert, 8s. to 9s. per bushel; cooking, 3s. 3d. to 4s. 6d. per bushel. Quinces, 4s. to 7s. per bushel. Lemons—choice, 9s. to 13s. per case; seconds, 5s. to 7s. 6d. per case. Persimmons, 4s. to 5s. 6d. per 20 lb. case. Passions, 4s. 6d. to 8s. 6d. per half-bushel. Grapes—hothouse, 9d. to 1s. 4d. per pound; outdoor, 5d. to 9d. per pound. Cape gooseberries, 4d. to 5d. per pound. Tomatoes—choice, 1s. 9d. to 3s. 6d. per 20 lb. case; seconds, 1s. 3d. to 2s. per 20 lb. case; tree-tomatoes, 3s. 3d. to 4s. 6d. per 20 lb. case.—*G. Craigie.*

WELLINGTON.—Throughout last month locally grown fruit came in fairly heavily, and values were very steady. Choice pears are in good demand; apples are realizing fair prices, the packing and grading of the latter having improved greatly. Tomatoes are in short supply, also cauliflowers, and prices are good. The prices ruling during the month are as follows: Apples—choice dessert, 5s. to 7s. per case; others, 2s. 6d. to 4s. 6d. per case. Pears—choice dessert, 8s. to 10s. per case; others, 2s. 6d. to 4s. 6d. per case. Grapes—Hutt-grown, 10d. to 11½d. per pound; Nelson-grown, 8d. to 10d. per pound. A few lines of peaches sold at 4s. to 4s. 6d. Tomatoes—round, 5s. to 7s. 6d. per case; others, 2s. 6d. to 4s. 6d. per case; seconds, 9d. to 1s. per case. Cauliflowers, 7s. to 10s.; others, 3s. to 5s. per sack. Cabbages, 4s. to 5s. per sack. Green peas, 6s. to 7s. per sack. Carrots, 3s. per sack. Pumpkins, 4s. 6d. to 5s. 6d. per sack. Marrows, 1s. 6d. to 2s. per sack. Beans, 3s. to 4s. per part sack. Mushrooms are in good demand at 5½d. per pound. Cape gooseberries, 5½d. per pound. Potatoes, good demand of table at £6 to £6 5s. per ton. Onions, excellent demand at £7 per ton.—*T. C. Webb.*

CHRISTCHURCH.—Oranges, 4s. 6d. to 5s. 6d. Apples, 3s. 6d. to 6s. 6d., the latter price being for late keepers. Pears, 3s. 6d. to 6s. 6d., the latter price being for late keepers. Tomatoes, anything good, 1d. to 2d. per pound. Potatoes, £4 per ton. Onions, £4 5s. per ton. Owing to Victorian onions coming in price it is possible that the local product may lower. Good dessert and cooking apples are in good demand, and there is every prospect of a rise in prices. Owing to a heavy marketing of mid-season pears, prices for this fruit have been low, but when these supplies are exhausted it is anticipated that a rise in prices will take place in winter varieties. Owing to the favourable weather the prospects for winter and spring vegetables are good.—*W. R. L. Williams.*

DUNEDIN.—All fruit was in good order with the exception of a few lines of tomatoes. Apples, pears, and tomatoes were plentiful; grapes, fair supply; peaches, plums, quinces, short supply; vegetables, fair supplies. Four warning notices had to be issued for fruit infected with pear-scab. Apples, eating, brought 7s. to 9s., cookers 4s. 6d. to 5s., per case. Pears, 6s. to 8s. per case. Plums, 1¼d. to 2d. per pound. Grapes, 6d. per pound; choice, up to 10d. per pound. Italian lemons, 12s. 6d. to 13s. 6d. per case. Rarotonga oranges, 5s. 6d. per case. Bananas, 7s. per case. Tomatoes, 2s. 6d. to 3s. per case. Peaches, 2½d. per pound. Potatoes, £5 5s. to £5 10s. per ton. Onions, £6 6s. to £7 per ton. Peas, 7s. per cwt. Cauliflowers, 6s. 5d. per sack. Cabbages, 3s. per sack. Marrows, 5s. 9d. per sack.—*E. T. Taylor.*

BLUFF.—New-Zealand-grown fruit, comprising tomatoes, apples, pears, quinces, peaches, plums, and grapes were fairly plentiful on this market during the month of April. The majority of the apples arrived from Nelson and Canterbury, and were of excellent quality. Southland-grown apples are not very good this year owing to bad season. The current prices for April were: Apples—cooking, 6s. to 6s. 6d. per case; local, 3s. to 5s.; dessert, 6s. to 11s. (special). Pears—cooking, 1½d. to 2d. per pound; dessert, 6s. to 9s. per case. Tomatoes, 2s. a box up to 3d. per pound. Quinces, 2d. to 2½d. Peaches (jam), 2d. to 3d. Plums (jam), 2d. to 3d. Grapes, 8d. to 10d. Jam melons, 7s. to 8s. per cwt. Potatoes, £4 5s. to £5 per ton. Onions, 7s. 6d. to 9s. per cwt.; pickling, 12s. 6d. Cabbages, 3s. per sack. Cauliflowers, 3s. per dozen. Marrows, 8s. to 9s. per cwt. Cucumbers, 2s. 6d. per dozen. Carrots, parsnips, and turnips, 1d. per bunch; carrots, 4s. to 5s. per sack; parsnips, 5s. per sack; swedes, 1s. 6d. per sack.—*R. Hutton.*

HONEY - CROP PROSPECTS.

THE Director of the Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—The honey crop for the Auckland District has been good on the whole. The prices ruling at present are from 10s. to 11s. per dozen 2 lb. tins for first grade and from 8s. to 9s. for second grade; inferior grades about 2½d. in bulk. The Waikato Beekeepers' Association has exported about 10 tons, and has a further shipment to forward next month; this will no doubt have a tendency to harden prices locally.—*G. V. Westbrooke.*

WELLINGTON.—The honey crop having been gathered, attention is directed to the marketing question. The crop on the whole is medium, but of good quality. Prices for good bulk produce range from 4d. per pound, and are holding firm. 2 lb. tins are quoted at from 10s. to 11s. per dozen; ditto glass jars, 13s. to 14s. A small shipment will be exported shortly from Taranaki.—*F. A. Jacobsen.*

CHRISTCHURCH.—The export trade for honey has commenced in Canterbury, and a trial lot has been despatched to both England and America. It is anticipated that prices will be to the advantage of producers, as the honey sent is of excellent quality. In Canterbury beekeepers are getting from 3½d. to 4½d., and in some instances as much as 5d., in bulk; retailed—2 lb. tins 1s., 2 lb. in glass jars 1s. 4d.; sections, from 6d. to 8d. A little more care is being taken by the producers in turning out honey in a more attractive and marketable form.—*L. Bowman.*

DUNEDIN.—Some very good yields of honey have been taken from bees during the past season in North Otago. Taking the district as a whole a record crop has been obtained, but two instances of good management tend to show how profitable bees become when run as a side line. Mr. John Patterson, Ngapara, secured 1,218 lb. from six hives, an average of 203 lb. per colony. Mr. A. McDonald, Enfield, secured 1,020 lb. from five colonies of black bees, with an increase of seven stocks. Bulk honey is coming forward steadily. Prices are unchanged. Small lots of honey in paper bags met with good demand. As yet no pat honey has come to hand. Good sections are scarce.—*E. A. Earp.*

According to the *Station für Pflanzenschutz*, Hamburg, the following Temperate Zone fruit was imported to Hamburg during the year from July, 1911, to June, 1912: From North America, 354,207 barrels and 86,620 cases of apples, and 509 barrels and 1,134 cases of pears; from South America, 9 barrels and 39 cases of apples; from Australia, 190,328 cases of apples, and 3,696 cases of pears.

THE WEATHER FOR APRIL.

D. C. BATES.

As a general rule there was a preponderance of anticyclonic conditions, with fair weather; but three periods of unsettled weather occurred, the first between the 2nd and 8th, during the passage of an antarctic depression in the south; the second between the 12th and 15th, on account of a similar type of depression, but of far greater intensity; and the third from the 26th to the end of the month, when two shallow depressions were in evidence. Of these, one apparently passed eastward of East Cape on the 26th, and the other was a "westerly low," which overspread the Dominion on the 29th. However, none of the above-mentioned disturbances was accountable for particularly heavy rains. The only districts with a total fall in excess of the average were Gisborne, South Canterbury, and Southland. All other parts of the Dominion recorded below the normal.

DISTRICT NOTES.

Chiefly from Telegraphic Reports.

District.

- 1, 2, 3. Fair and clear weather predominated, and the wind-force was slight during the month except on the 8th, 14th, and 26th. On the latter date high northerly winds were experienced accompanied with heavy rains. The total rainfall, however, was everywhere below the average, the difference ranging from 35 to 60 per cent.
4. About 65 per cent. less than the average rain fell. On the few days on which it was recorded conditions were showery, no particularly heavy rain falling during the month. Fair and dry weather was the rule.
5. The rainfall was about 35 per cent. below normal along the coast, but further inland a much greater deficiency was recorded. Very favourable weather was experienced.
6. Extremely dry weather prevailed, the aggregate rainfall only being about one-seventh of the normal for April.
7. Owing to heavy rain between the 5th and 8th, and on the 27th, the total for the month greatly exceeded the average, in some cases by double. There were three short periods of wet and unsettled weather, but fair conditions intervened.
8. Excepting a few scattered stations where a slight excess was recorded, most parts of the district had less than the average rainfall by about 35 per cent. Between the 19th and 26th fair weather prevailed, and also on several shorter periods. The wind attained gale force on several days.
9. Sixty per cent. less than the average rain fell in this district. The first half of the month was somewhat unsettled, and temperatures were low at times. Snow fell on the higher levels on the 6th, and several hard frosts occurred inland. The last half of the month was mild and fine.
10. What little rain fell was during the first half of the month, the total being about 30 per cent. below normal. Gales were reported on the 7th, 8th, and 14th, but usually the month was free from strong winds, the last few days being almost continuously calm. Very favourable weather-conditions prevailed.



District.

- 11, 12, Precipitation was only about half the average for April, there being an absence of heavy rains except on the higher country on the 14th. Electrical conditions prevailed in parts about this date, and strong winds. The month as a whole was fair, with a large amount of sunshine. Frosts were frequent in the first half of the month.
- 13.
14. Very little rain fell in this district, the total being about 50 per cent. below the mean. Fine, bright days and cold nights with frosts were the rule.
15. Very heavy rain fell on the 13th, which brought the total up to more than the average generally. Several periods of unsettled and wet weather prevailed, but fair conditions predominated.
16. On the 30th, and about the middle of the month, cold and unsettled conditions were experienced, and snow fell on the high levels. The remainder of the month was fine, with bright days and cold but sometimes foggy nights. Precipitation was usually about the normal.
17. The rainfall was slightly above the average owing to a heavy fall on the 13th. Snow also fell at this time, and also on the 16th. A considerable amount of dull weather was experienced with much mist and fog, but otherwise conditions were not unfavourable.
18. The northern portion of this district had considerably less than the average rainfall for the month, but elsewhere a slight excess was recorded. Heavy rain fell on the 13th and 30th, but between the 15th and 30th fine weather prevailed. The early portion of the month was cold and at times unsettled. Frosts occurred on several occasions.
19. About the average or a slight excess was reported. Weather-conditions similar to district 18.
20. A fine month, with three short periods of unsettled conditions. A strong north-wester veering to south-west gale brought heavy rain on the night of the 13th. Rainfall 25 per cent. less than the average. Some sharp frosts were experienced.
21. Heavy rain on the 13th and 30th accounted for a slight excess of the average rainfall. Snow fell on the higher levels on the 30th. Fine weather predominated during the month.
- 22, 23. During the greater part of the month fair weather prevailed, and about 50 per cent. less rain than the average was recorded. Squally conditions prevailed on the 13th.
24. About the average rain fell in this district, the only remarkable fall occurring on the 30th. Weather similar to that experienced in districts 22 and 23.
25. Changeable and showery conditions ruled generally from the 1st to the 17th. heavy rain and sleet falling on the 13th. The rest of the month was fair except the last two days. Precipitation was above the average by from 20 to 40 per cent.

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of April:—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
2	Jersey ..	Heifers ..	London ..	C. Day ..	Tamahere, Wai-kato.
SOMES ISLAND (WELLINGTON).					
2	Shorthorn ..	Bulls ..	Sydney ..	Dalziell Bros.	Hunterville.
QUAIL ISLAND (LYTTELTON).					
1	Collie dog ..	Male ..	London ..	James Lilico ..	Lochiell.
1	Red polled calf	Bull ..	Melbourne ..	R. H. Rhodes ..	Tai Tapu.
1	Shorthorn ..	..	London ..	W. B. Cunningham	Brookside.

ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the *Journal* in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question, the most complete descriptive details should be furnished.

WOOD-BORER.

S. H., Takapuna, Auckland, writes,—

Enclosed herewith please find specimens of the work of the wood-borer. The creature especially attacks willow and kahikatea. Can you kindly tell me, through your *Journal*, how sheds, tool-handles, baskets, &c., can be preserved from attack, and how, when once attacked, they can be saved?

The Director of the Orchards, Gardens, and Apiaries Division replies,—

Wood-boring Beetle.—I have tried various experiments in connection with the above, and will give briefly the results:—

When the backs of pieces of furniture, such as cupboards, were attacked I painted them with kerosene or corrosive sublimate, or any of the arsenic sprays. If the timber needing treatment is large, I take a common garden knapsack spray-pump, with cyclone nozzle, and spray the article or wall well with one of the arsenic sprays, preferably the arsenic and soda. This should be done in the early summer, before or during the emergence of the beetles. My first experiments were commenced years ago, and were conducted as follows: Large glass jars were obtained, and a piece of wood containing numerous "grubs" placed in each. To these were added two pieces of white-pine of equal sizes, one of which had been treated with one of the specifics mentioned, the other perfectly fresh. The result was that in every case the untreated piece was badly attacked before two years were over, while the poisoned piece was sound. Either the female realized that the treated wood was not a suitable place for the depositing of eggs, or the tiny "grubs" were poisoned before they had eaten into the timber. I have for many years recommended this treatment to persons communicating with me. I recognize that in affected dwellings it means removing the paper and spraying the walls thoroughly, possibly in some cases removing portions of the lining. I have been hoping to get the use for a couple of years of some old building so as to test the matter on a large scale, but up to the present have not been successful. However, the course above advocated has proved effectual as—(a) laboratory experiment, (b) on packing-cases and furniture, (c) on a fowlhouse. I also treated with arsenic, six years ago, some white-pine timber of which I built a stable, and so far can find no trace of attack, although a piece of board not sprayed and loosely nailed in one corner for the purposes of comparison has numerous holes.

The following are directions for mixing the arsenic-and-soda spray: Proportions—1 lb. white arsenic, 2 lb. washing-soda, 70 gallons lime-water. Preparation—Place the arsenic in 2 gallons of water in which 2 lb. washing-soda has been dissolved, and boil until arsenic is thoroughly dissolved. As this will produce a liquid almost like clear water, and is, of course, extremely poisonous, it is advisable to use some simple colouring-matter to prevent mistakes.

FUNGUS DISEASE.

"SUBSCRIBER," Port Chalmers, writes,—

I am forwarding under separate cover four varieties of plants attacked by, I believe, a fungoid disease. Can I be informed, through your *Journal*, of the name of the disease, and of any means of preventing it? No. 1, Gaillardia: The balls of fungi have formed inside the stalk, and are attached still. When attacked in this form the

whole plant dies quickly; but I have noticed the same balls formed on the outside of the stalk, much smaller, but in greater numbers. In this case the plant usually dies off stalk by stalk. Nos. 2, Gaillardia; 3, sweet pea; and 4, dahlia: The disease on each of these seems to be much the same.

The Biologist replies,—

The specimens of diseased gaillardia, sweet pea, and dahlia are attacked by stalk sclerotium. This disease is probably parasitic on a greater number of different kinds of plants than any other fungus, members of all the families of cultivated plants being attacked, white and swede turnips, cabbages, carrots, broad and haricot beans, potatoes, cucumbers, melons, hemp, petunias, zinnias, pelargoniums, chrysanthemums, dahlias, sweet peas, &c., being among the number of its victims. The disease commonly attacks the stem, commencing as a white mould at the ground-line and working upwards. When the parasite has been at work for some time the leaves turn yellow and wilt, and finally the stem collapses, death being due to lack of food and water, owing to the mycelium of the fungus having clogged up the vessels, and thus retarded the passage of water up the stem. When the stem is hollow the mycelium is produced in considerable quantity in the cavity, and forms large numbers of sclerotia, varying in size from turnip-seed to that of a pea, white, then black externally. When the stem is solid the sclerotia are formed in its substance, and visible on the surface. If diseased stems are allowed to lie and decay on the ground, or even if they are placed on a heap in some out-of-the-way corner, the sclerotia remain on the ground when the stems decay, and the following spring give origin to several brown funnel-shaped ascophores borne on long, slender stems. The spores from these fungi affect plants on the spot, or are blown about by wind and start the disease in a new locality.

In the case of plants producing tubers or fleshy roots, as mangels, turnips, pot toes, &c., the mycelium also passes downward into these parts, and eventually forms sclerotia, more especially if sweating occurs after storing. If such infected tubers, &c., are planted, disease follows.

Diseased stems should be burned, and not allowed to lie about, for the reasons given above. In flower-beds, &c., where this disease has previously existed, 2 in. of the surface soil should be removed, and replaced by fresh soil mixed with a little quicklime. Green stable manure favours the disease.

WOOLLY APHIS.

MR. G. H. BONNINGTON, 142 Ferry Road, Christchurch, writes,—

Can you suggest a check for the blight on apple-trees—woolly aphis. This blight is very severe in the Canterbury District this season. My Ribston Pippins and Cox's Orange Pippins suffer severely. I have tried kerosene emulsion and McDougall's insecticide, but they only partly destroy the pest. I understand the Orchard Expert at Weraroa Experimental Farm has discovered a cure for this blight; if so, it will be a big benefit to orchardists, and I feel sure would be eagerly sought after by Canterbury fruitgrowers.

The Orchards, Gardens, and Apiaries Division replies.—

The following is the treatment recommended for the control of woolly aphis: Spray the trees in the winter, when quite dormant, with red-oil emulsion, using one part of the emulsion to fifteen parts of water. Paint any colonies that escape the winter spray with red-oil emulsion *undiluted*.

COW TROUBLE.—POA AQUATICA.

MR. G. S. THOMSON, Otautu, Rawene, Hokianga, writes,—

1. When bringing in my cows this morning, one stopped suddenly, turned round two or three times, and then fell down in convulsions. The legs were kicked out violently, and the breathing was short and rapid, occasionally stopping altogether for about ten seconds. After some fifteen minutes the animal struggled to her feet, staggered about for some time, and finally appeared to recover. She remained standing

or walking about slowly for an hour or more without attempting to eat, when another attack came on similar to the first, but rather longer. Again she seemed to recover completely, but a third and final attack came on which lasted over two hours, and ended in death about six hours after the first symptoms appeared. During the three attacks the eyeballs were strongly distorted, appearing to shrink inwards, and turning downwards until only the whites were visible. Towards the end breathing was very difficult, the head being thrown back as far as possible, while the legs were still jerked about spasmodically. A little froth appeared at the mouth, which was firmly closed all the time. During this very dry weather my cows have spent most of their time on a swampy flat, covered for the most part with rushes and raupo, and a little tutu in places. There are also several species of buttercup present. Would waoiriki (*R. ricularis*) or other species of *Ranunculus* produce the symptoms described? What treatment, if any, do you advise?

2. Part of my land is on the banks of the Waima River. The upper stretches of the Waima as far as Taheke are bordered with willows, the lower as far as Rawene with mangroves. My place is between the two, too fresh for mangroves and too salt for willows. A large area of flat is just above ordinary high water, but is covered in places by an occasional high spring tide. Drainage would be difficult and costly. I intend to try *Poa aquatica* on it this winter. Will it stand an occasional dose of salt or brackish water; and, if not, can you recommend any other grass suitable for such a situation?

The Live-stock and Meat Division replies,—

From the description you give of the symptoms it would appear that some poisonous agent was the cause of death. What this was is doubtful. Animals poisoned by the different species of the *Ranunculaceae* generally show symptoms of colic, salivation, diarrhoea, often spasms, grinding of the teeth, &c.—in fact, act as gastro-enteric irritants. Tutu, on the other hand, seems to have a specific action on the brain, paralysing the nervous functions. One result of this is the accumulation of gas in the rumen or first compartment of the stomach. This “hoven” condition, by pressing on the lungs and heart in the thoracic cavity, soon causes death of the animal unless relief is afforded by puncturing the rumen, and other remedies, such as preparations of ammonia or other stimulants. An answer to a correspondent on tutu-poisoning will be found in the November *Journal*, 1911, page 234. You do not appear to have made a *post-mortem* examination. If this had been done it would have been more satisfactory.

The Fields and Experimental Farms Division replies,—

Poa aquatica is not very tolerant of sea-water, but it will endure occasional periods of submersion, provided they do not last more than a day. It will not, however, endure being covered a short time by each tide. The best grass for actual salt ground is the American wild rice (*Rizania aquatica*). This grass is naturalized on the banks of the Northern Wairoa. It is not of much value for feed, but is mainly a soil-protection grass.

MANURES.

“PUHI PUHI,” Hapuku, Kaikoura, writes as follows:—

Would a dressing of the advertised potato-manures, and likewise mangel-manures, do for land that I think is a bit worked out, instead of using new ground? It is only a small area turned over with the spade, and this year my potatoes and mangels are a poor crop. If so, how much manure would you suggest? Can too much be put on, and what time in the spring is the best to apply the same? Also, how do you account for a few sets of potatoes doing well, whilst most of the sets in the same rows were poor, the seed being all well sprouted before planting.

The Fields and Experimental Farms Division replies,—

The proprietary manures advertised by many merchants in New Zealand may be accepted as decidedly valuable for the various crops which they are designed to fertilize. On land such as you describe (somewhat worked out) they would undoubtedly be beneficial. As the area you mention is but small and is cultivated with the spade, the condition of the soil could be greatly improved by the application of manure from the stable, yards, or cow-shed. It is impossible to advise you

authoritatively as to the amount of manure to be applied; 3 cwt. to 5 cwt. is the usual quantity availed of. An excessive quantity of manure would undoubtedly result in increasing the foliage of the crop as against the tubers of the potato or the roots of the mangel. This the correspondent has no doubt observed during his farming experience. There can be no specified time during the spring at which to apply manure. In field practice, for the purpose of economy, it is applied at the time of sowing the seed. On garden plots it is desirable to well work in and incorporate the fertilizer some time before planting. The time must depend on the season and conditions. Without a close acquaintance with the soil, the previous crops grown, and the season, it is undesirable to venture an opinion as to why some sets of potatoes were satisfactory and others were not. There may have been a variation of the soil that affected this. This you yourself would be in the best position to judge.

SORREL.

MR. HECTOR M. J. NICOLSON, Otaki, writes,—

Will you please tell me the best way to eradicate sorrel?

The Fields and Experimental Farms Division replies,—

Sorrel can be controlled, and ultimately brought to a condition in which it is no longer injurious, by repeated cultivation, particularly during summer. Lime is claimed to assist in destroying this weed. Probably the action of lime is that it renders the soil more alkaline, and provides a condition in which other plants flourish. At the same time, the withdrawal of acid reduces the vigour of the sorrel, as it is a plant which is accepted as thriving where the soil is acid.

BUDA KALE.

“WAI AU” writes as follows:—

I note a report of an experiment at Moutmahaki Experimental Farm with Buda kale in your *Journal* of the 15th March. Will you tell me if the kale was a transplanted crop, or just ordinary drilled-in seed?

The Fields and Experimental Farms Division replies,—

The Buda kale seed was obtained from an ordinary crop drilled in December, 1911. The produce was cut and carted to cattle during March, 1912, after which the plants were allowed to grow during winter. In early spring the cultivator was used between the rows, and the plants allowed to grow and produce seed.

PASPALUM DILATATUM.

MR. CHRIS. M. HANSEN, Opotiki, Bay of Plenty, writes,—

Would you kindly, through the issue of your valuable *Journal*, verify whether I am correct in condemning the use of paspalum. This grass was introduced only a few years ago on account of its readiness to strike on poor fern lands where other grasses had failed, and I think in that respect it has proved itself a success with a vengeance. It is also said that it is credited with power to wipe out Canadian thistle; if that is true, it is the only virtue that I know of in its favour for infested localities. But odds are greatly against it, and yet people are sowing it in the Bay of Plenty district on flats and swamps regardless of consequences. Surely it is bad enough as it is. The stock is rapidly carrying it from the hills to low-lying parts, or, for that matter, to any vicinity. The greatest objection against it is that it is not adapted for haymaking, as the blades only grow short and lie close to the ground; it grows outwards and spreads. It does not provide winter feed as well as cocksfoot. All haymaking plants will have short lives in paspalum areas; and if it makes cultivation difficult I should like to know if it has any other virtues above other grasses than to kill.

The Fields and Experimental Farms Division replies,—

The experience of the Department is that south of Auckland paspalum should be avoided with the greatest discretion. It appears undesirable to introduce this grass on to fertile lands. It there has the effect of dominating other and more useful plants. It is also to be doubted if its average nutritive qualities are developed in comparatively cool districts. It is a semi-tropical grass, and it requires warmth to develop its most desirable properties. It is probable that it is most useful on poor soils. It flourishes under all conditions, provides a large quantity of feed, and is eaten by stock where the other grasses are but poorly developed. In the more northern districts, and in Australia, paspalum is esteemed. The general recommendation is to avoid its use on fertile lands, and to use it with discretion on poor lands. It undoubtedly grows very closely, and may have some effect in destroying Canadian thistle in certain localities.

SOIL CHEMISTRY.

MR. A. R. BARTLETT, Oak Farm, Silverdale, writes,—

I wish to study the chemistry of the soil, and would be very grateful if you could inform me of text-books and apparatus necessary.

The Agricultural Chemist replies,—

The following works are suggested :—

Title.	Author.	Publisher.
Agricultural Chemistry	Adie and Wood	Kegan Paul.
The Soil	A. D. Hall	John Murray.
Soils	Hilgard	Macmillan and Co.
Agriculture in Some of its Relations with Chemistry	Storer	Sampson, Low, and Co.

You will learn from the books the apparatus required.

EXTERMINATION OF RATS.—CIDER.

MR. JOHN RICH, Karoola Orchard, Havelock North, writes,—

Have you anything giving information as to the best way to clear a lot of farm buildings of rats? Have you anything dealing with the making of cider?

The Live-stock and Meat Division replies,—

Phosphorized pollard as is generally used for rabbit-poison is most effective, provided the rats are allowed to steal it.

Procedure: Prepare a quantity of pollard, as if intended for rabbit-poison, adding sugar and a little salt, but without phosphorus. Put the dough into a number of soup-plates or shallow dishes, putting as much fat on the top as will, when dissolved, cover the dough a quarter of an inch thick all over. Put the plates in an oven until this is accomplished, and let stand until cool, when the fat will have become hard. Distribute the plates in the most suitable places about the buildings. The rats will soon discover the bait, cut through the fat, and eat the dough from underneath, usually through a single opening, leaving the fat practically undisturbed. In two or three nights the dough will be all taken. Lift the plates, and after cleaning them thoroughly, refill with phosphorized pollard about the same consistency as the previous bait; cover up with fat as before; allow one night to elapse, and replace the plates in their former positions, when a heavy slaughter may be expected. By this process there is practically no danger of poison being dropped by the rats, who have a tendency to carry food, &c.

The Orchards, Gardens, and Apiaries Division replies,—

Full particulars on cider-making appeared in the April *Journal*, 1911 page 249

CELERY APHIS.

MR. JAMES WARD, Esk Street, Invercargill, writes,—

We have had a specimen of celery sent us. It has blight, and our correspondent has lost two crops in the same way. I suggested that you might be able to tell us what to do with it. As the crop is going the same this year as last, an early reply would oblige so that some of the crop may be saved. We would be much obliged if you could tell us what to do with it. It is grown on a sandy soil, but there are no trees or shrubs near the plants.

The Orchards, Gardens, and Apiaries Division replies,—

The celery specimens forwarded are attacked by celery aphis. The plants should be sprayed with either tobacco-wash (using 1 lb. strong tobacco or 3 lb. waste tobacco, 3 lb. soft soap, and 30 gallons water), or use kerosene emulsion at the rate of 1 of the emulsion to 15 water. Directions for making the above sprays are given on the Department's spray leaflet, which may be obtained on application to the Department. A sprayer throwing a fine forcible spray is most suitable, and care should be taken to see that the under-sides of the plants are well covered.

WORK ON FARMING.

MR. J. G. WILSON, Clonbern Road, Remuera, Auckland, writes,—

I should be glad if you could suggest me a good work on general farming, mainly with sheep, suitable for any one thinking of going in for the work as a beginner.

The Live-stock and Meat Division replies,—

Probably Morton's "Handbooks of the Farm," cost about a sovereign, and live-stock handbooks, for similar price, published by Vinton and Co., Chancery Lane, London E.C., would suit. Should advise you, if seriously thinking of taking up sheep-farming, to go for a year or so on a station.

GRASSES.—RAMS.

"FARMER," Kawhia, writes,—

I shall be much obliged if you will answer the following questions through the medium of the *Journal* :—

1. Which of all the grasses of the couch variety is most nutritious ?
2. Which makes the best growth ?
3. Which is it that is sometimes called Kentucky blue-grass ?
4. Is the most nutritious as nutritious as *Danthonia pilosa* ?
5. Are Romney rams which have been used for three seasons, commencing as two-tooths, good for any further seasons ; and, if so, for how many ewes ?

The Biologist replies,—

The name "couch" is often applied to any grass that spreads by means of underground rhizomes but the following species are the ones that are most frequently termed "couch-grass" : (1) Smooth-stalked meadow grass or Kentucky blue-grass (*Poa pratensis*) ; (2) florin (*Agrostis stolonifera*) ; (3) twitch (*Agropyron repens*) ; (4) Indian doob-grass (*Cynodon dactylon*) ; (5) buffalo-grass (*Stenotaphrum glabrum*). As the term "couch-grass" is a general one, it is better not to apply it to any single species.

The idea of determining the value of grasses from the viewpoint alone of nutritiousness is by no means satisfactory, as the feeding-quality of grasses is likely to vary very much indeed on different soils and under varying climatic conditions. I place the following characters as of prime importance in determining what grasses are particularly suited to be used :—

(1.) *Palatability*.—This is most important, as the value of any grass and its capacity for carrying stock depends almost entirely on whether or not the herbage produced is consumed readily. In many cases, again, palatability depends on the age of the herbage; many grasses that are well liked when young may be more or less rejected when the herbage is old, although, so far as nutriment is concerned, they may be superior when in a comparatively unpalatable condition.

(2.) *Ability to grow well under the required conditions*.—This, coupled with a consideration of (1), will in most cases determine what grasses should be used.

(3.) *Ability to produce feed during the winter*.—This is, of course, a very important consideration with all grasses that are used in the formation of pastures that are grazed on throughout the year.

Probably the best of the couch-grasses is *Poa pratensis*, and in permanent pastures that are not too dry in summer it is highly recommended, although it has the bad character of not combining well with other grasses that are of a tufted nature and often suppresses them, a character that is, however, not unusual in underground-stemmed grasses. On dry soils and ones of low fertility the yield of herbage is unsatisfactory, and in many instances under such conditions *Danthonia pilosa* is far preferable. On land that may be used for cropping, *Poa pratensis* is looked upon with great disfavour, as it is very difficult to kill, ploughing under being quite useless unless followed by extensive cultivation during the summer.

The florins and bent-grasses (*Agrostis* spp.) are very important grasses in second- and third-class country where the rainfall is fairly high. They are, however, apt to get away in the autumn, and when this occurs cattle should be utilized to feed them down. I, of course, would not advise their use in good rye-grass and cocksfoot country, as they are apt to overrun the ground to the detriment of the better grasses. *Danthonia pilosa* and crested dogtail combine fairly well with the bent-grasses. Twitch (*Agropyron repens*), which on arable land is one of the most pernicious of weeds, is probably of value on certain soils, such as grassed sandhills, depleted dry soils, &c. The herbage is well liked by stock.

Danthonia pilosa is, without doubt, the most valuable of any of our grasses for poor land, but up to the present the seed is not sown in sufficient quantities to at once form a sward. There is a mistaken idea that the individual seeds of *Danthonia pilosa* are very light, and that there are an enormous number per pound. In point of fact, the number is not more than that of cocksfoot, and averages about 550,000. From this it is apparent that it is as necessary to use as much danthonia on land where it is to be the dominant grass as one would use of cocksfoot on land where that grass is intended to provide the main bulk of the feed. *Danthonia pilosa* is well liked by stock, and grows readily during the winter, and certainly in this respect is improved by burning off in the early autumn, but the temporary gain is probably more than counterbalanced by the permanent injury that results from excessive firing of the grass land.

The Live-stock and Meat Division replies,—

5. Yes; but it is not policy to use old rams as flock rams. A ram is sexually at his best from about fifteen months to four years. After this his powers decline, this depending a good deal on how he has been used in previous seasons and his natural constitution. Old rams, too, often have a deposit of lime salts in the worm-like appendage of the penis, rendering them useless for breeding purposes.

MILK-FEVER.

MESSRS. PARSONS BROS., Whenuakura, write,—

Could you advise in your answers to correspondents—(1) The best treatment to be given to a cow with milk-fever; (2) whether it is necessary to give drench, if using sterilized-air pump; (3) symptoms of cow with milk-fever?

The Live-stock and Meat Division replies,—

There is no better treatment than inflation of the udder. Preferably this should be done with oxygen gas. If atmospheric air, however, is forced through sterilized cotton-wool into the udder, in most cases it acts efficiently.

No; it is not necessary to give a drench when using pump. At this period the animal is generally comatose, and has lost the power of swallowing. There is great danger of the drench going down "the wrong way" and choking the animal straight away, or else setting up inflammation of the lungs. It often happens that animals recover from the milk-fever only to die from this cause. If a drench is given, it is best to give it a day or two prior to calving.

Symptoms vary in different cases. Generally the first sign is the animal hanging back in the bail, with the head drooping. She may be uneasy, whisking her tail, "paddling" with her hind legs, or kicking at the belly. If the calf is with her she ceases to take notice of it. In some cases, where she can do it, the head is pressed against the wall or post, in a sleepy attitude. At other times there is excitement, bellowing, &c. She becomes unsteady in her gait, and either lies or falls down. She may rise again, but gradually goes down, and is unable to get up. This is the stage where attention is generally called to them. The animal may be found lying flat on her side, or more often on her breast, with her head turned round into the flank. Sensation is lost, and the front of the eyeball may be touched with the finger without any response. Tears run down the face, and saliva dribbles from the mouth, owing to loss of the power of swallowing. In a word, the cow is unconscious, or nearly so. The breathing is usually slower and deeper than normal, and is often stertorous in character. The temperature is usually below normal, not higher, as the term "milk-fever" would lead us to believe. Regarding the secretion of milk, this may stop suddenly or diminish gradually: at other times it does not appear to be interfered with. The above are the usual symptoms shown, varying in degree in different cases. The most useful sign from a diagnostic point of view is the loss of sensibility of the eye, and its gradual return is also your best guide in determining if recovery is taking place.

MISCELLANEOUS QUERIES.

R. C., Taneatua, Whakatane, writes,—

1. I would like to know what is the value of 100 gallons of both liquid and solid manure from pigs fed on skim-milk, and would you recommend using lime with it before carting out in the paddock? If so, what quantity to 100 gallons, what kind of lime, and when should it be mixed, whether as soon as emptied or just before it is carted out? I am getting a 100-gallon tank with a large tap for the purpose. What would you recommend for the cow-shed? Any remarks about the latter will be very acceptable.
2. Would storing mangels in heaps out in the paddocks without any covering do for one, two, or three weeks before carting to the cattle in the winter, or is it absolutely necessary to store them in a house or cave; and what effect would the iron have on the mangels through the frosty weather? Would old sacks prevent any harm to them?
3. Could you tell me the difference in value of mangels when fed without storing, and when stored, say, three months?
4. Is it advisable to graze down rye-corn or let it stool out? If so, at what height should it be grazed? I require the rye for early-spring feed for dairy cows.
5. Would you recommend using basic slag on a green crop to be ploughed in for manure, or after it is ploughed?
6. What is the best time to use kainit—before winter or in early spring—for grass land?

The Agricultural Chemist replies,—

1. Both the liquid and solid portions of the pig-manure are valuable, but no information is available as to the relative values.

The Fields and Experimental Farms Division replies,—

1. Lime should not be used. The tank described should be suitable. More even distribution would result if the liquid were received from the tank into a perforated trough.

2. It is unnecessary to cover mangels. If you desire to use some covering, sacks would be preferable. Iron is a rapid conductive medium, and would be harmful.

3. This has not been tabulated. In practice it is recognized that mangels do not exercise so laxative an effect after storage as when consumed direct from the field.

4. Corn and grass are fed down to encourage stooing. No definite height can be stated, but when the greater part of the crop is exhibiting vigour—say, 6 in. to 8 in.

5. If the land requires a green crop to be ploughed in, it is most probable that a fertilizer will be necessary to enable it to produce a bulky crop for effective green manuring. A light crop would be useless. It is also likely that on such lands a fertilizer would be valuable for the crop that follows after the ploughing in.

6. Fertilizers, except those of nitrogenous elements, can be applied in autumn. Therefore kainit may be used now.

TANSY (*Tanacetum vulgare*).

“COUNTRY” writes,—

Would you please tell me the name of the plant a piece of which I enclose. If it is a bad weed, would you tell me the best way to get rid of it.

The Biologist replies,—

The plant sent is tansy (*Tanacetum vulgare*). This is a European plant found in various localities throughout New Zealand. It is not a serious weed.

PLANTATION AND SHELTER TREES.

MR. LESLIE O'CALLAGHAN, “Leslie Downs,” Sherwood, Fairlie, writes,—

Could you kindly let me know next issue what are the best plantation and live-hedge trees to plant in this district. I am getting good results in *Pinus insignis*, but would like some other varieties of plantation and shelter trees. Our altitude is 1,750 ft. to 2,000 ft., about thirty miles from the coast.

The Orchards, Gardens, and Apiaries Division replies,—

The following trees should prove very suitable for plantation and shelter planting in your district: *Pinus muricata* (Bishop's pine), a dense-growing tree, and one of the best for shelter planting; *Pinus austriaca* (Austrian pine), splendid shelter tree, timber suitable for posts; *Abies douglasii* (Douglas fir), timber valuable; *Pinus ponderosa* (Bull pine), produces valuable timber.

HOLSTEIN COW DOMINO III.

“ARGUMENT,” Kaupokonui, writes,—

Would you kindly inform me if Mr. Kyle, the Ayrshire breeder, ever owned the Weraroa Holstein cow Domino III. I have been told that on the day Domino III made 113 lb. of milk it cost the value of the milk to feed her. Is that so?

The Director of the Fields and Experimental Farms Division replies,—

This animal was bred by Mr. J. C. N. Grigg, Longbeach, and was purchased from him by the Department of Agriculture in 1910. On the day that Domino III gave 113½ lb. milk she received, besides grass, 10 lb. chaff and 2 lb. pollard, costing 6d. The value of the milk and progeny produced by Domino III since her purchase three years ago is £578 5s. 10d. As far as I am aware, Mr. Kyle, the Ayrshire breeder, never owned this animal.

IMPROVING NEGLECTED ORCHARD.

MR. T. KEANE, Ararimu, *via* Drury, writes,—

Would you let me know through your *Journal*,—

1. The best method of improving a neglected orchard, where the trees have been allowed to grow without pruning or spraying and the grass to grow around them? What is the best manure; and ought they to be pruned now?

2. What would be the best spray for the checking of the disease on the leaves and stalks that I am sending you?

The Orchards, Gardens, and Apiaries Division replies,—

1. It is difficult to give detailed advice without seeing the trees. They may not be worth treatment. The Orchard Instructor for the district will visit you, and advise as to the cultivation, pruning, and spraying necessary, provided the trees have not been too much neglected to render treatment profitable.

2. The specimens sent indicate that the trees should be sprayed with Bordeaux mixture to control the fungus diseases present. A leaflet giving directions for mixing will be posted.

COW-GRASS ATTACKED BY DODDER.

MR. T. H. PILBROW, "Thornington," Glenpark, Otago, writes,—

The enclosed is a root of cow-grass with a growth of some kind. Will you please answer through your *Journal*, telling me what the growth is, or any other useful information? I had sown a paddock of about 80 acres mostly in cow-grass. It was cut for hay this summer, and I noticed a few patches like the enclosed—some of them 2 to 3 yards round. Where it appears it kills the clover completely. Should you require further information, I will be only too pleased to give it.

The Biologist replies,—

The cow-grass specimen sent is attacked by a South American species of dodder (*Cuscuta racemosa*). The dodders spread solely by means of their seeds, which are difficult to separate from those of the various clovers in which they are found. The presence of dodder in clover fields is generally indicated by the appearance of yellow-coloured patches. These patches should be immediately cut out close to the ground and the cuttings burned. This, if undertaken before the dodder flowers, will generally be found effective.

PULLETS MOULTING.

MR. T. HORTON, Christchurch, writes,—

I have a dozen in one pen of White Leghorns about six months old. Some of them laid for about three weeks, and then they have all gone into moult. They are well housed, well fed, and have proper attention. Would you kindly let me know what might be the cause, through the *Journal*?

The Live-stock and Meat Division replies,—

The birds have probably been subjected to a sudden change of food or quarters.

The steamer "Rotorua," which sailed from Wellington to London on the 1st instant, had on board 6,054 cases of apples for Montevideo, 5,656 cases being from the Nelson district, and the remainder from the Hastings district.

The steamer "Tainui," which sailed from Wellington to London on the 17th ultimo, took from the Dominion 5,017 cases of apples for Montevideo, 4,750 cases being from the Nelson district and 267 cases from Hawke's Bay. The vessel also shipped at Dunedin 504 sacks of potatoes for Rio de Janeiro.

COMMERCIAL REPORTS.

AUSTRALIA AND NEW ZEALAND POTATOES.

CONDITIONS GOVERNING AUSTRALIAN IMPORTATION OF POTATOES FOR FOOD PURPOSES.

THE official Commonwealth conditions under which potatoes grown in New Zealand may be imported into Australia for food purposes until 31st December, 1913, are as follows:—

(a.) That the potatoes are accompanied by an official certificate identifying the shipment and certifying that they were grown in New Zealand, and that they have been inspected and show no signs of the following diseases:—

<i>Phytophthora infestans</i> ..	Potato-blight.
<i>Synchytrium endobioticum</i> ..	Potato-canker, black scab, warty disease, and cauliflower-disease in potatoes.
<i>Lila solanella</i>	Potato-moth.
<i>Oospora scabies</i> (<i>Thaxter</i>) ..	Potato-scab.
<i>Anguillulidae</i>	Gall or eelworm.

(b.) That they are packed in clean new bags.

(c.) That the bags, crates, or other packages are marked with the name of the country of origin.

(d.) That upon inspection at the port of discharge in Australia the potatoes are found free from disease, and are so-certified by a Plant Quarantine Officer.

(e.) That no importation shall take place without the permission of the Minister given prior to the shipment of the potatoes from New Zealand.

Produce-merchants desiring to import should make application for the Minister's authority to the Chief Quarantine Officer for Plants, Department of Agriculture of the State into which it is desired to import the potatoes.

LONDON WOOL-SALES.

The High Commissioner, under date of London, 6th March, reports as follows on the second series of London wool-sales:—

The second series of this year's colonial wool-sales commenced on Tuesday afternoon, when catalogues comprising 9,516 bales, of which 4,311 were from New Zealand, were submitted to auction. There was a very large attendance of buyers and others interested at the opening, and competition for all parcels submitted was exceedingly keen. This competition was, however, confined mainly to Home and Continental buyers. Representatives of American houses, although present at the sale, refrained from operating, the reason for this abstinence being understood to be the uncertainty at present existing regarding tariffs in America. This consequently caused the advance in prices that had been anticipated by brokers and others closely connected with the woollen industry to be less than expected.

On the first day of the sales there were few lots of merino wool submitted, the offerings being almost entirely confined to crossbreds. For the few merinos, as also for fine crossbreds, bidding, while brisk, was not sufficiently keen to raise prices above those ruling for these classes at the close of the last series of sales. For medium and coarse crossbreds, however, values were advanced on average about $\frac{1}{4}$ d. per pound. This information was, as usual, cabled to Wellington on the evening of the opening day of

the sales. Since then, however, some attractive lines of merino wool have been submitted, and the value both of merinos of all grades and of fine crossbreds have participated in an advance of about $\frac{1}{2}$ d.

Manufacturers everywhere are busy, and mills are fully employed with orders to keep them occupied for some length of time to come. Consumption of wool is naturally large, and the demand is reported to be in excess of the supply. The market, therefore, is very strong, and there is every prospect of the advance in price being continued.

The quantity of wool available for the present series of sales is 155,073 bales. Of these, 76,400 are from the Dominion.

FROZEN MEAT IN SWITZERLAND.

The High Commissioner furnishes the following despatch from H.M. Minister at Berne, dated 10th February, in regard to frozen meat imported into Switzerland :—

With reference to my despatch No. 5, Commercial, respecting frozen-meat imports into Switzerland, I have now the honour to forward the following further information, which covers the whole year 1912.

Frozen-meat imports into Switzerland during 1911 :—

				Kg.	Per Cent.
Australia	..	..	..	150,000	13.5
New Zealand	..	..	..	16,800	1.5
Argentine	..	..	..	946,500	85.0
Total	..	..	..	1,113,300	

Frozen-meat imports into Switzerland during 1912 :—

				Kg.	Per Cent.
Australia	..	..	..	503,000	20.25
New Zealand	..	..	..	17,800	0.75
Argentine	..	..	..	1,952,200	78.75
Other countries	..	..	..	6,900	0.25
Total	..	..	..	2,479,900	

It should be borne in mind that the London strike interfered considerably with the import of frozen meat *via* London ; that the agency opened by Messrs. W. Weddel and Co., of London, at Geneva did not commence business until after August, 1912 ; and that, owing to the Italian market being overstocked with Argentine meat, prices for this article were quoted in Switzerland much below London rates. In consequence of this hardly any business was done in Australian meat during the latter part of December last.

GERMANY AS A MARKET FOR NEW ZEALAND FRUIT.

G. L. KNOWLES.

In view of the ever-increasing production of fruit in general, and of the apple in particular, in New Zealand, the following translation of a short article which appeared in the Hamburg newspaper *Import-Export-Transport* on the 22nd February, 1913, should be of very special interest to those fruitgrowers engaged in the search for outlets for their products overseas :—

"The fruit crop in Germany having been very poor during a number of recent past seasons, especially with regard to apples, of which only very frugal harvests have been gathered, it became necessary to import, and the importers extended a welcome alike to America, Australia, France, and Italy as sources of fresh supply. The German importers have now, however, cause for complaint in that the American apples imported in barrels are so badly sorted and graded that, considering the trouble and risk involved in handling, the net profit is only very small. Consequently the importers are now determined that this bad grading shall be stopped, and they are ordering more in box-packings, on account of the better grading and greater weight they receive in this form of packing. The trade in barrel-packed apples has, therefore, in the meantime, some-

what fallen off. In the year 1910 alone 17,000,000 marks' worth (about £850,000) of apples were imported; and in 1911 this figure rose to 42,500,000 marks (about £2,000,000). Australia is stepping with confidence into the competition with America, and is facilitating the trade with herself by means of the much-preferred box-packing. Furthermore, the German public much prefers the Australian apple. Russia, also, is making very energetic efforts to push her trade in particularly fine sorts of apples with Germany."

Does not the foregoing read as a lesson, and at the same time as a further hope, for the New Zealand orchardist? As the article shows, the German public already has a preference for the Australian apple, and New Zealand apples are recognized in Europe (as elsewhere) to be equal, if not superior, to any produced in the Commonwealth.

In comparison to the huge number of consumers, an exceptionally small quantity of apples is grown in Germany, which, with its sixty-seven millions of inhabitants, may be said to present an almost unlimited field to the enterprising foreign fruitgrowers who will take the trouble to find out exactly what the German public wants—and ship it. The chief thing to be aimed at is uniformity of quality and grading.

From my own observations in Hamburg and elsewhere in Germany, it is evident to me that, if properly "nursed," there is no reason why the German market should not be made to prove one of the largest and most remunerative for New Zealand fruit.

For first-class apples, properly graded and packed in boxes, high prices are easily obtainable. The average retail prices for such in Hamburg—probably the cheapest retail market for fruit in the whole of Germany—is no less than 50 pfennigs (6d.) per pound.

It is "up to" New Zealand to come into line in a businesslike manner, and so take her fair proportion of the fruit trade in this great market.

TRADE BETWEEN VICTORIA AND NEW ZEALAND.

The imports into Victoria from New Zealand for the quarter ended 31st March, 1913, amounted to £284,746, the principal lines being—Horses, stallions £2,310, mares £2,095; bullion, gold, bar, rod, dust, &c., £62,065; hemp, £13,365; fish, £4,315; bran, pollard, and sharps, £1,456; machinery, all kinds, £1,094; tow, £2,295; rugs, £1,414; skins, hides (cattle), £11,488; specie, gold, £100,000; timber, £60,422.

The exports from Victoria to New Zealand for the same period amounted to £137,922, the principal lines being—Bark for tanning purposes, £3,098; books, printed, &c., £8,877; fancy goods, £2,004; fruits, dried (currants, raisins, sultanas), £285; fruits, fresh, £2,111; flour, wheaten, £1,673; rice, cleaned, £3,753; cameos and precious stones, unset, £3,588; leather, £5,016; machinery, all kinds, £6,539; manures, superphosphate, £1,547; oils, eucalyptus, £2,933; rubber manufactures N.E.I., £25,421; skins, hides (cattle), £1,084; stationery, manufactured, £1,392; tea, £8,876; tobacco, manufactured, £16,235; wine, all kinds, £3,075.

JAPANESE-AUSTRALASIAN STEAMSHIP SERVICE.

A short time ago it was stated in the Press that the Nippon Yusen Kaisha Company intended to extend its present Japanese-Australian steamship service to New Zealand, but as no official confirmation of the statement could be obtained locally, the Department of Agriculture, Industries, and Commerce communicated directly with the head office of the company in Japan. A reply has now been received to the effect that the company is not at present in a position to consider an expansion of its Australian service to the Dominion, or the inauguration of a direct service.

Winter Show Dates.—Waikato (Hamilton), June 3-7; Otago (Dunedin), June 3-6; Taranaki (New Plymouth), June 11-14; Southland (Invercargill), June 17 and 18; National Dairy Show (Palmerston North), June, 17-20; Waimate (South Canterbury), June 20 and 21; Dominion Dairy Show (Hawera), June 25-28.

THE DOMINION'S EXPORTS TO BRITAIN.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri-gum, Cases.	Sundry.
January,	1913 166,714 1912 237,284	229,179 302,399	6,886 12,424	109,251 114,512	63,864 64,005	118,986 95,994	..	329	..	6,969 6,965	2,215 1,942	4,110 3,407	611 carcasses pork. 59
February,	1913 326,337 1912 205,424	403,698 273,246	12,666 13,052	89,098 101,544	81,733 62,398	127,968 106,074	..	..	..	12,520 6,831	4,295 1,615	7,973 1,056	64 carcasses pork. ..
March,	1913 86,224 1912 324,192	210,166 518,402	7,428 20,201	47,560 64,925	59,844 49,308	49,661 70,022	..	115	..	12,552 3,832	7,662 1,352	4,043 2,644	250 carcasses pork. 16
April,	1913 303,937 1912 213,178	647,948 355,829	16,834 7,046	11,358 38,966	52,934 35,137	61,988 31,615	..	300	..	9,049 5,134	3,351 1,958	3,889 4,458	457 carcasses pork. ..
May,	1912 454,506 1911 204,390	744,287 377,105	32,691 20,173	1,441 995	40,535 20,732	51,833 33,033	11,157 93,854	26,569	1,500	11,963 7,443	2,826 1,210	6,287 7,720	1,087 carcasses pork. ..
June,	1912 170,738 1911 214,079	287,697 448,432	24,605 15,789	558 ..	7,712 6,323	18,138 19,568	9,160 39,422	7,622	2,039	5,646 4,763	1,168 525	1,213 5,528	221 carcasses pork. 2,434
July,	1912 231,097 1911 206,869	371,474 260,761	29,457 14,296	684 ..	1,255 276	16,567 14,100	44,324 29,452	23,215	20,573	7,463 6,022	1,856 1,073	5,892 2,786	210 carcasses pork. 175
August,	1912 207,239 1911 66,608	157,589 110,054	10,478 3,653	559 ..	..	10,409 5,260	42,580 31,976	38,802	19,562	3,758 3,443	523 303	4,219 3,475	203 carcasses pork. ..
September,	1912 44,657 1911 102,081	40,759 40,057	1,174 6,059	8,723 6,404	1,204 ..	6,671 7,390	15,742 38,151	17,363	19,933	2,957 5,604	501 393	3,671 7,672	220 carcasses pork. ..
October,	1912 51,263 1911 9,417	15,393 2,043	3,882 100	49,962 49,626	16,389 11,501	4,647 2,182	7,952 ..	64,480	5,396	4,193 4,514	401 754	9,075 2,982	.. ..
November,	1912 54,175 1911 47,770	8,286 10,427	282 403	140,751 135,741	57,181 57,319	33,305 44,934	3,680 15,833	40,896	13,892	9,866 7,844	1,911 2,183	5,466 3,085	.. ..
December,	1912 117,740 1911 72,192	106,310 91,965	4,774 765	119,885 109,397	66,213 46,883	44,789 54,297	5,868 ..	30,490	10,070	3,816 5,719	2,613 1,364	3,686 2,708	.. ..

LONDON MARKET VALUES.

COMPARATIVE STATEMENT COMPILED FROM THE HIGH COMMISSIONER'S CABLES FOR THE THREE MONTHS ENDED 30TH APRIL, 1913.

1913. London Date.	Mutton.			Lamb.			Beef.			Butter.			Cheese.		Hemp (Spot).			Hemp (Forward Shipment).			Wheat.		Oats.
	Canterbury.	North Island.	Canterbury.	Other than Canterbury.	Hinds.	Fores.	New Zealand.	Danish.	Siberian.	Australian.	Argentine.	New Zealand White.	New Zealand Coloured.	Canadian.	New Zealand Good-fair.	New Zealand Fair.	Manila.	New Zealand Good-fair.	New Zealand Fair.	Manila.	Short-berried.	Long-berried.	Sparrowbills.
Feb. 1	d. 47 1/2	d. 47 1/2	d. 71 1/2	d. 68 1/2	d. 35 1/2	d. 31 1/2	113/0	127/0	109/0	107/0	105/0	60/0	60/0	6/0	34/0	32/0	34/0	32/0	35/0	37/0	38/0	24/0	23/0
" 8	d. 43 1/2	d. 43 1/2	d. 7 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	116/0	129/0	110/0	109/0	108/0	60/0	60/0	6/0	34/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
" 15	d. 43 1/2	d. 43 1/2	d. 7 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	120/0	129/0	110/0	110/0	110/0	60/0	60/0	6/0	34/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
" 22	d. 43 1/2	d. 43 1/2	d. 6 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	116/0	131/0	110/0	112/0	110/0	60/0	60/0	6/0	33/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
Mar. 1	d. 43 1/2	d. 43 1/2	d. 6 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	117/0	133/0	110/0	111/0	110/0	60/0	60/0	6/0	33/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
" 8	d. 43 1/2	d. 43 1/2	d. 6 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	117/0	133/0	110/0	110/0	109/0	61/0	61/0	6/0	34/0	31/0	34/0	32/0	34/0	32/0	38/0	..	..
" 15	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 5 1/2	d. 33 1/2	d. 33 1/2	119/0	133/0	110/0	110/0	109/0	61/0	61/0	6/0	34/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
" 22	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 5 1/2	d. 33 1/2	d. 33 1/2	119/0	130/0	109/0	109/0	109/0	61/0	61/0	6/0	34/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
" 29	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	119/0	129/0	111/0	109/0	109/0	61/0	61/0	6/0	34/0	31/0	33/0	32/0	34/0	32/0	38/0	..	..
Apr. 5	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 6 1/2	d. 33 1/2	d. 33 1/2	117/0	125/0	110/0	108/0	108/0	60/0	60/0	6/0	64/6	34/0	31/0	33/0	34/0	31/0	34/0	..	..
" 12	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 6 1/2	d. 41 1/2	d. 41 1/2	115/0	120/0	110/0	108/0	108/0	60/0	59/0	65/0	33/0	30/0	33/0	33/0	30/0	33/0	33/0	..	..
" 19	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 6 1/2	d. 41 1/2	d. 41 1/2	113/0	119/0	108/0	109/0	108/0	58/0	..	..	33/0	30/0	33/0	32/0	32/0	33/0	33/0	..	..
" 26	d. 41 1/2	d. 41 1/2	d. 6 1/2	d. 6 1/2	d. 41 1/2	d. 41 1/2	115/0	120/0	106/0	109/0	106/0	58/6	..	..	32/0	28/10	33/0	32/0	28/10	34/0	34/0	..	..

HEMP AND TOW GRADING RETURNS.

APRIL.

Hemp.—The total number of bales graded was 18,620, as compared with 9,169 for the corresponding month of last year, an increase of 9,451 bales. For the twelve months ending 30th April, 1913, the number of bales graded was 120,993, as compared with 88,375 for the previous twelve months, the increase being 41,618 bales.

Tow.—During the month 6,230 bales were dealt with, as compared with 2,474 for the corresponding month of last year, an increase of 3,756 bales. For the twelve months ending 30th April, 1913, the number of bales graded was 44,689, as compared with 24,317 for the previous twelve months, the increase being 20,372 bales.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF APRIL, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	904	2,688	605	76	..	4,273
Napier ..	..	132	116	8	21	..	..	277
Foxton ..	..	..	764	3,277	532	17	..	4,590
Wellington ..	..	..	1,803	3,588	366	25	54	5,836
Blenheim ..	2	31	213	57	..	..	..	301
Picton ..	26	211	84	145	203	..	..	669
Lyttelton ..	..	20	34	..	..	..	..	54
Dunedin ..	..	..	227	503	..	..	..	730
Bluff ..	..	..	245	1,515	130	..	..	1,890
Totals ..	28	394	4,390	11,781	1,857	118	54	18,620
Percentages of totals	0.14	2.11	23.58	63.27	9.97	0.64	0.29	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	55	451	1,210	104	1,820
Napier ..	..	26	29	..	55
Foxton ..	36	694	249	3	982
Wellington ..	225	1,206	542	36	2,009
Blenheim ..	41	13	21	..	75
Picton ..	119	49	104	..	272
Lyttelton ..	..	23	..	..	23
Dunedin ..	..	79	105	6	190
Bluff ..	7	260	438	99	804
Totals ..	483	2,801	2,698	248	6,230

Stripper-slips.—Passed for export: Auckland, 38; Napier, 7; Foxton, 583; Wellington, 524; Blenheim, 6; Picton, 15; Lyttelton, 12; Dunedin, 7; Bluff, 80—total, 1,272. Condemned: Auckland, 10; Wellington, 80; Bluff, 47—total, 137.

NEW ZEALAND-SAN FRANCISCO SUBSIDIZED STEAM SERVICE.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti, and transhipments for Vancouver from New Zealand, since January last:—

	"Aorangi," 3rd Jan.	"Tahiti," 31st Jan.	"Moana," 28th Feb.	"Aorangi," 28th March.	"Tahiti," 25th April.
Gum, packages	..	20	20	50	..
Seeds, sacks	..	..	..	31	61
Grain, &c., sacks	343	69	324	57	115
Meats, cases	523	272	100	262	250
Onions, cases	6	52	1,759	10	8
Potatoes, sacks	11	24	2	32	10
Sundries, packages	948	126	54	131	235
Butter, boxes	5,894	7,782	7,281	3,783	405
Hemp, bales	173	296	282	..	271
Frozen lamb, carcasses	..	3	2	3	2
" veal, ...	..	71	..	..	..
" beef, quarters	..	489	150	..	..
" sundries, packages	..	..	2	..	13
Timber, pieces	..	1,440	..	93	..

NEW ZEALAND-VANCOUVER TRADE.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since November last:—

	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.	"Zealandia," 14th Feb.	"Marama," 14th March.	"Makura," 12th April.
Butter, boxes	5,945	11,377	10,960	5,205	9,402	6,535
Eggs, ...	..	..	..	..	..	..
Beef, quarters	..	580	716	..	1,254	2,428
Veal, carcasses	..	393	276	181	400	402
Frozen sundries, packages	5	12	..	39	147	86
Wool, bales	6	20	30	..	..	..
Grass-seeds, beans, &c., sacks	177	..	..	54	..	147
Hides and skins, sacks, &c.	559	595	329	583	..	249
Onions, cases	..	..	14	1,572	..	732
Sheep-skins, bales	..	..	24	112	..	24
Jam, cases	100	50	50	75	175	25
Sundries, packages	329	92	313	250	214	470
Potatoes, crates	..	165	20	..	..	..
Kauri-gum, packages	53	21	..	176	41	7
Hemp, bales	..	..	246	129	126	..

STOCK EXPORTED.

APRIL.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.			Sheep.		Swine.	
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To South America.	To Australia.	To Pacific Islands.	To Argentine.	To Pacific Islands.
Auckland	1	13	..	..	18	..	..	264	..	16
Gisborne	..	8	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	..	..	..	..	..
Wellington	3	..	..	..	..	1	66	..	..	..
Lyttelton	..	..	..	..	..	..	4	..	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	12	..	..	..	..	..	..	..	..	..
Bluff	..	..	..	..	..	..	690	..	..	..
Totals	16	21	..	..	18	1	760	264	..	16

The following are the particulars of the horses shipped : Thoroughbred—2 geldings, 1 mare ; draught—7 stallions, 2 colts ; hackney—1 stallion, 4 geldings, 20 mares.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of April, 1913, of agricultural and farm products :—

Item.	Quantity.	Value.
Bran	Nil	£
Butter	Nil	..
Cheese	3 cwt.	13
Chaff	1 ton	8
Fruits, fresh, all kinds	1,253,115 lb.	7,015
Barley	7 centals	5
Oats	2 centals	3
Wheat	14 centals	10
Onions	383 cwt.	151
Pollard and sharps	Nil	..
Potatoes	Nil	..
Seeds, grass and clover	1,063 cwt.	2,999
Total values imported	..	£10,205



SOUTHDOWNS AT RUAKURA



The
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WELLINGTON, N.Z.,
16TH JUNE, 1913.

PRICE,
SIXPENCE.

SHEEP - MANAGEMENT.

VIEWED FROM THE HEALTH STANDPOINT.

C. J. REAKES, D.V.Sc., M.R.C.V.S.

Continued from April issue.

PARASITIC DISEASES.

INTERNAL parasites still cause considerable loss to sheepowners, though far less than was the case some fifteen years ago, when heavy mortality occurred every year, among hoggets especially, throughout the west coast of the North Island, principally as a result of the attacks of lung and stomach parasites. At that time, and to some extent since, so-called lung-worm was looked upon as being the more serious affection, but the probability is that then, as now, the presence of small hairlike worms in the fourth stomach was really responsible for the greatest proportion of deaths, lung-worms being present in the animals at the same time. It must not be assumed that I suggest that these lung-parasites are not seriously dangerous, for they are, and many young

sheep have died from the effects of their presence. But the stomach-worms are the worst pest, and it is necessary, in districts where the conditions of soil and climate are favourable to their dissemination, to take practical precautions to guard against their attacks. These precautions are summarized in the following extract from the Bulletin on the subject, No. 3 (new series):—

“To realize fully the value of preventive measures, the life-history of the parasites, so far as known at the present time, must be understood. Each animal suffering from the disease daily passes innumerable ova (eggs), and, possibly, also newly hatched worms, or mature female worms, loaded with eggs, who, having fulfilled their function, die, leaving the eggs virile (a single female may produce thousands). The eggs deposited on the pasture are ready to be taken up by sheep feeding upon it, who thus continually renew their trouble. In low-lying, wet pastures these worm-‘eggs’ and, possibly, also immature worms developed from them after deposition upon the ground-surface, or voided by the infected animals, are able to retain their animal vitality outside the animal body for a much longer period than on dry and sunny land. Therefore, removal from contaminated land to dry, well-drained, not-heavily-grassed paddocks is not only essential as a matter of treatment, but the depasturing of young sheep upon such paddocks is one of the best preventive measures. It is a notable fact that a few parasites may be found in the fourth stomach of a very great proportion of healthy and vigorous young sheep—it is only when present in large number that they do noticeable harm—and, seeing that they do not multiply within the body, it is obvious that suitable outside conditions are necessary to enable them to infest sheep badly. These conditions, as already stated, are to be found in low-lying, wet, badly drained pastures, in heavily grassed land where surface water does not get away freely, and also, during wet seasons, on good, well-grassed, otherwise sound paddocks. Whenever such conditions, favourable to the propagation of the parasite, exist, a close watch should be kept, and at the first clear indication of parasitic gastritis the flock should be transferred to another paddock—the best-drained and driest available.”

As regards lung-worm, the same preventive measures apply, the conditions of soil, pasture, &c., which are favourable to the spread of the stomach-worms, being equally favourable to the worms infesting the lungs.

The sheep-maggot fly has been known to be present in the Dominion for some years past, and at times causes trouble. Though we cannot hope to rid the country of this insect, yet by careful shepherding and precautionary measures it can be prevented from doing any serious harm to our flocks. It deposits its eggs on dirty wool, and the filthier this is the better it seems to suit the fly. The maggots hatched out from the eggs afterwards burrow into the skin, or, if a slight wound be present, it affords them a still easier means of gaining entrance. The obvious precautionary measures are to maintain the sheep in as cleanly a condition in regard to their wool as possible. Proper dipping, crutching, dagging, &c., are necessary; and if scouring be present care should especially be taken to keep the posterior parts clear of dung-clogged wool, and, further, measures should be taken, by change of feed, &c., to stop the scouring if possible. If a wound is sustained it should be promptly dressed with tar. In the case of a sheep being "struck," the wool at the part should be closely clipped off and strong antiseptic dressings applied to the part, all maggots found being carefully removed and destroyed.

DIETETIC DISORDERS.

In order to maintain sheep in good health and condition care is necessary in the matter of the class of pasture on which they are placed. Rough, rank grass, especially of autumn growth, is not a suitable food for sheep, and at times considerable loss occurs through sheep being grazed on feed of this kind. A form of chronic indigestion is set up, resulting in a certain amount of fermentation occurring in the food in the stomachs or the bowels, which is apt to cause trouble in some form or other. In some cases the sheep simply die, in others they do badly, having fits of scouring alternated by constipation. Another condition resulting from this improper feeding is the development of an inflamed condition of the skin of the face and ears, causing such severe irritation that the affected animals, in their endeavours to obtain relief, rub their heads against fence-posts, logs, or on the ground-surface, often causing abrasions of the skin when doing so. This breaking of the skin enables outside germs to gain entrance and set up a condition of dry gangrene, the animals then presenting a most unsightly appearance. The whole of the skin of the head is converted into a sort of dry scab, with matter beneath, the eyes are inflamed and often sightless, and unless proper treatment be applied in time death frequently

occurs. It has been noted that when a large proportion of deaths do occur in an affected flock the liver has been found in a state of fatty infiltration, and the fatty condition of this important organ has naturally been a factor in the digestive derangement which has preceded the skin trouble. This affords another illustration of the necessity of so managing a flock, of breeding-ewes especially, that the animals do not become unduly fat at any time. Breeding-ewes have been at times heavy sufferers from facial eczema (or facial dermatitis), as this trouble of the skin of the head is termed. Unless in seasons when a heavy growth of rank autumn feed occurs, when it is difficult, and at times impossible, for owners to avoid depasturing their sheep upon it, there should be no reason for the sheep being exposed to the unfavourable feed-conditions liable to set up this affection, and careful management in this direction will prevent its occurrence. If it does occur, the prompt application of proper treatment will check it and prevent any severe loss. Change to short sweet pasture is the first measure to be adopted, and at the same time a strong solution (5 per cent.) of Lysol, Izal, or Jeyes fluid should be applied to the skin of the face and ears once daily for three or four days, care being taken to prevent it getting into the eyes or on the inside of the lips. This quickly allays the irritation present in the skin during the earlier stages of the trouble.

In those cases where facial trouble does not appear, but the sheep are simply sick, or are dying from the severe digestive disturbance set up by the rank, rough feed, the necessity for a change to a better paddock is obvious; and where the animals are considered of sufficient value to be worth the expenditure of the time and labour necessitated by the administration of medicine, one or two 3 oz. or 4 oz. doses (according to age) of Epsom salts dissolved in thin gruel are of great value. Great care must be exercised in drenching the sheep or they will be subjected to the risk of being promptly killed by the liquid finding its way into the windpipe and the lungs instead of into the stomach.

Lambs when on rape are liable to develop a skin affection, the skin of the ears especially becoming swollen and inflamed, general constitutional symptoms, which may result in death following unless the animals are promptly removed and given a change of diet in a grass paddock, when they soon recover.

Another form of skin trouble arising from the same cause is that known as "rape-scald," the skin along the back being usually affected

in this case. This has the additional disadvantage of impairing the value of the pelt. Here, again, a change to less-stimulating feed is required.

Some years since a considerable mortality occurred every year in the South Island among sheep, usually hoggets, when feeding on turnips. It was due to a disease closely resembling braxy. The cause lay in a germ present in the soil, which gained entrance into the systems of the animals. There is every reason to believe that one important feature in the prevalence of the trouble at that time lay in the dissemination of infection from the carcasses of dead sheep left to rot on the ground-surface. At the same time, apart from this, there can be no doubt that the provision of a run off from the turnips on to a good grass paddock, by providing a variety of diet and a better camping-ground, is an important factor in avoiding loss from this disease. An additional advantage is that the animals do better with a mixture of other food with the turnips, the admixture of grass food aiding the digestion of the whole, and enabling them to obtain the greatest benefit from the turnips eaten. Dry feed, as oaten chaff, hay, &c., would answer the same purpose, but it means expense, and the animals do not always take readily to it.

Southern farmers have largely availed themselves of the knowledge gained regarding this disease, and the losses from it are now very small compared with those of some years ago.

CONCLUSION.

In concluding this paper I would once more impress upon sheep-owners the fact that good management is essential to successful sheep-farming, and that by the exercise of care and forethought much loss from disease in its various forms can be avoided. Much of the information given is based on the observations made by Dr. Gilruth, who, during his tenure of office in New Zealand, did an immense amount of good work in connection with sheep-management and sheep-diseases.



EARMARKING.

A SUGGESTED SYSTEM.

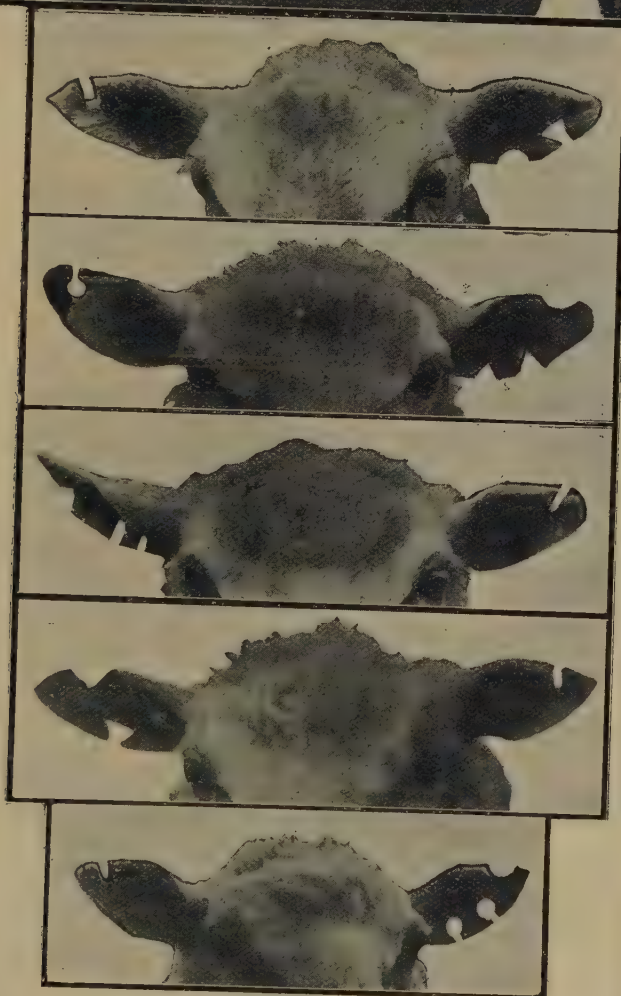
J. L. BRUCE.

THE accompanying illustrations are reprints of photographs demonstrating a system of ear-marking sheep devised by the writer. The system is based upon the manipulation of a code of five approved marks, none of which, it will be observed, are capable of effectively defacing any other code-mark; consequently this eliminates the possibility of the surreptitious substitution of an existing mark (see key on page 583).

The earmarks depicted in the illustrations were applied to a number of lambs on Quail Island about eighteen months ago, and were recently photographed. Under this system seventy separate and distinct earmarks can be obtained by using one pair of pliers, 300 by using two, and 1,000 by using three, each representing a number signifying the breeder's registered earmark, by which, if recorded immediately opposite his name on the margin of the printed sheep returns of the Dominion (as is part of this system), the registered earmark of the breeder of any sheep can be definitely ascertained on reference thereto.

On the opposite ear to the breeder's earmark, and near to the tip, is placed the district mark. This mark also denotes a number indicating the stock or brand registration district in which the sheep were bred, thus not only facilitating the prompt location of the breeder but making it possible to allot a distinct and separate earmark for every sheepowner in the Dominion, from which the breeder's name and address can be obtained on reference to the published sheep returns.

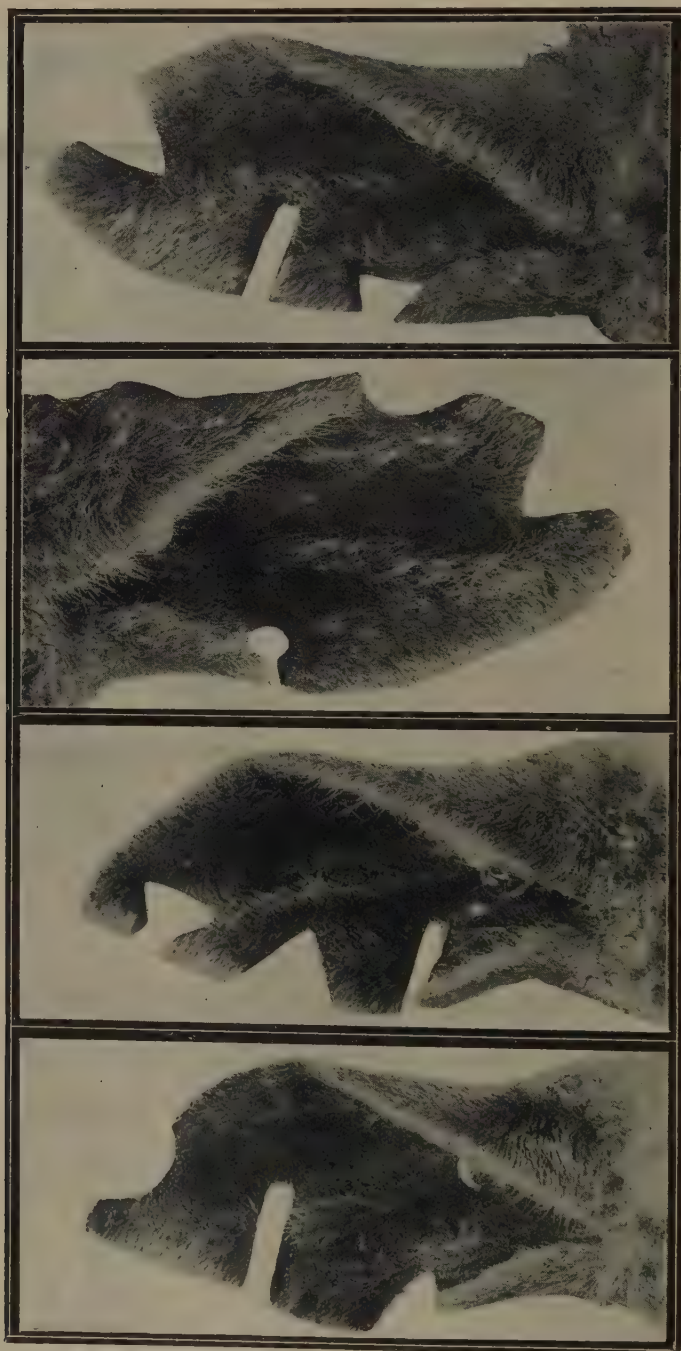
An age-mark, consisting of a single punch-mark, representing the year in which a lamb was born, may be added near the centre of the ear on which the district mark is shown—i.e., a punch-mark representing 1 on the code for 1911, code-mark 2 for 1912, and so on up to 1920, commencing again with mark 1 for 1921. Age-marking, may, however, be optional.



BREEDERS' EARMARKS, ETC.

The breeder's earmark is shown on the near ear on ewes and off ear on wethers, with the district mark on the opposite ear. All are in District 1 except Nos. 311 and 852 in the group, the former having no district mark, the latter being District 5, and the second single sheep (No. 944), which belongs to District 7.

Breeders' numbers: Group, reading from left, 311, 40, 852, 53, 982, 15. Single sheep 60, 944, 422. 36. 988.



SINGLE EARS.

Breeders' numbers, reading from top : 326, 398, 642, 924.

All marks are in every case read from the tip of the ear towards the head, in the order in which they are placed upon the ear (see illustrations herewith).

Attention is directed to a very small punch-hole shown in the centre of the ear on earmarks representing District 1, breeders' Nos. 36 and 60. This is a portion of the system, and is intended to prevent tampering with any earmark consisting of less than a maximum number of marks. For example, when an earmark consists of a single mark two small punch-holes are added, and when it consists of two marks, as in the illustration just referred to, only one small punch-hole is added. In the case of a full earmark consisting of three marks no punch-hole is required. It will thus be seen that the addition of any mark or marks to an ear containing either one or two punch-holes would be an infringement of the system, and clear evidence that the ear had been tampered with; it would nevertheless still show the breeder's original mark.

Under this system the punching-irons would be uniform, and will possibly be supplied by the Government at cost price.



MILKING BY HAND.

PRIMROSE McCONNELL.

IN these days of milking-machines, many types of which do very effectual work, it would at first sight seem almost superfluous to discuss the subject of "Milking by hand"; but, unfortunately, even the best machinery is liable at times to get out of repair, and, as milking is work that cannot be put off even for a short time, a failure of the machinery will always necessitate a recourse to the hands: hence it is necessary for the machine attendants to have a knowledge of the above art. This is further emphasized by the fact that there is a small percentage of cows which refuse to be milked by machinery: and with a small herd hand milking is more profitable than milking by mechanical means.

Milking by hand is an art that requires very great knack, patience, and energy if it is to be successfully accomplished. To obtain complete success with any system of milking, the cows should first of all be slowly and quietly driven in from the paddock, for the less they are excited the more freely do they yield their milk when they reach the byre. No unnecessary talking or banging of pails should be allowed, and the presence of strangers—particularly children—should be in no way encouraged during milking-time, as anything of this kind tends to excite cows of a highly nervous temperament.

Previous to commencing milking all the udders and flanks should be wiped with a damp cloth wrung out of a mild solution of lysol, and the milker's hands should be washed in a similar solution previous to and after milking each cow. This will not only ensure cleaner milk, but will also prevent the spread of such a disease as mammitis, which is not readily distinguished in the initial stage.

Kindly treatment—which gives the cow confidence in the attendant—expedition, and thoroughness are necessary to bring about the best results. If there is no desire on the part of the operator to learn the art thoroughly it is not likely that proficiency will ever be reached; and a milker of this sort should never be allowed inside a cow-byre except to clean it out. On the other hand, an indifferent milker (if willing to learn) may become proficient through getting a few lessons from an expert. If a cow is being skilfully milked her whole appearance will denote contentment, the most pronounced indication

being a chewing of the cud. If she shows uneasiness, it is due either to unnecessary roughness on the part of the milker or to some injury to teats or udder, and if the latter it will demand extreme patience and delicacy of handling on the part of her attendant.

The milker should approach the cow with a kind word and a pat, at the same time putting down the milking-stool as gently as possible. He or she should sit close up to the cow, with head pressed against the flanks. One arm will then be in such a position as will enable the milker to press it firmly against the hollow of the cow's hock in the event of her attempting to lift her leg. Many milkers sit down, and take up such a careless position that they cannot possibly do effective work or have any control over the movements of the cow—and this is, no doubt, the cause of such a free use of the leg-rope. Although the Ayrshire cow is naturally of a nervous temperament, yet in her native country herd after herd may be seen milked without the use of the leg-rope.

The milking should be commenced by grasping the fore teats *gently* with a *dry* hand, full pressure not being used until the cow lets the milk into the teats. The fingers should not be put completely round the teat, as is sometimes done, but only about three-quarters round, pressing the teats with the points of the fingers against the palms of the hands. This enables the operator to milk in a more expeditious and efficient manner than he would do if he put his fingers completely round the teat—because in the latter case pressure is not brought to bear on the milk-duct, which is a comparatively small channel in the centre of the teat. The perpendicular “tug” which causes a movement of the whole body of the cow, and hence an annoyance, is an absolute abomination.

The pressure should be horizontal only, the arms remaining almost motionless except for the action of the muscles, the teats scarcely ever being stretched beyond their natural length. There should be a slight upward pressure similar to the calf sucking; and a first-class milker will never let go until the teats are empty. The fore teats should be milked first, as this tends to increase the yield from and develop the fore quarters, which in a great percentage of cows are much less capacious than the hind ones. A good milker will completely empty the udder by horizontal and slightly upward pressure alone, without any undue stretching of the teats.

The question of milking with a dry or wet hand is a much debated one, but the best milkers, in my experience, milk with a dry hand. As I previously stated, the main essentials to success are expedition and cleanliness. It is a well-known fact that a thoroughly efficient milker will milk a cow giving 30 lb. milk perfectly clean in five minutes, while

another professedly good milker may spend ten minutes at the same cow and succeed in getting only 26 lb. In a herd of cows good milkers are invaluable, and worthy of very liberal remuneration.

Clean efficient milking stimulates the milk-glands and induces them to yield more and more milk: a lack of thoroughness causes them to become inactive and produce less and less, ultimately drying off the cow prematurely. If the milkers are efficient and trustworthy, stripping is unnecessary, but in the majority of cases it is desirable. Of course, it is admitted that there are exceptional cases which demand unusual treatment, but on the whole it will be found that expedition combined with gentleness is the keynote of successful milking. Women, as a rule, make the best milkers, and this art may be seen in perfection in the writer's native country (Ayrshire), where the female milker predominates.

LAMB-FATTENING.

EXPERIENCE AT MOUMAHAKI.

T. W. LONSDALE.

IN recent years many changes have taken place in agricultural practice. One of the most noteworthy has been that of reducing the age at which lambs are ready for marketing, and it is generally admitted that the earlier these can be brought to maturity the better they pay. To achieve this desired economy in production, rich, easily digested food is necessary, and hence the reason for the various forage crops now grown in this country for lamb-fattening. As to which variety of forage excels, this will probably for many years remain an open question. Climatic conditions vary considerably, and though in one season some particular forage may rank above others, the same variety may during the following season prove an absolute failure.

In the year 1912 an experiment designed to solve this problem was carried out at the Moumahaki Experimental Farm. The results of that trial could not be regarded as conclusive, and it was considered advisable to continue the experiment. In the tests conducted this season maize, which was tested the previous year, was not used, but other varieties of forage were tried, six crops being tested, as against four in 1912.

In 1912 the forage tested comprised silver-beet, rape, maize, and Buda kale. This year's trials included silver-beet, rape, chou moellier, Thousand-headed kale, Buda kale, and lucerne.

In 1912 the lambs remained on the forage eighteen days, and were weighed at the commencement and termination of the test. In this season's experiment fourteen days were allowed, the lambs being weighed three times during that period.

On the 13th March an even line of long-woolled lambs were selected, and divided into six lots of nineteen each. Each lot was weighed and marked with a distinguishing brand, so that, should the lambs accidentally get mixed, the straying ones could be immediately returned to their respective plots.

Following are the results of the 1912 and 1913 experiments:—

	Silver-beet.	Rape:	Chou Moellier.	Thousand-headed Kale.	Buda Kale.	Lucerne.
1913.						
Weight of 19 lambs—	lb.	lb.	lb.	lb.	lb.	lb.
March 13	1,092	1,022	1,071	1,051	1,120	1,108
March 26	1,258	1,171	1,190	1,177	1,190	1,286
Total increased weight ..	166	149	119	126	70	178
Average individual increase	8.73	7.84	6.26	6.63	3.68	9.36
1912.						
Average individual increase	6.40	7.30	..	..	2.40	..

The results obtained from the Buda kale are in accordance with the 1912 trial, but the positions of silver-beet and rape have been reversed. Thousand-headed kale and chou moellier are practically equal, while lucerne, which had never been tested for feeding-value at this farm, ranks foremost.

In carrying out experiments of this description it must be recognized that good judgment is essential. The selection of suitable animals requires the aid of an experienced judge of live-stock, and, assuming that selection has been all that could be desired, so many things may occur which discount all previous calculations that it is only by the most careful supervision we may expect to arrive at any approach to accuracy.

WARNING TO PURCHASERS OF BASIC SLAG.

It has recently come under the notice of the Department that low-grade basic slag, containing only about 10 per cent. phosphoric acid, is being imported, the fertilizer being sold in terms of tricalcic phosphate, 22 per cent. This is probably misleading to the purchasers, who may think that they are buying a slag containing 22 per cent. phosphoric acid (anhydride), which would be equal to 48 per cent. of tricalcic phosphate. Importers and purchasers of basic slag are strongly advised to carefully examine their invoice certificates, and, if in any doubt as to the quality of the slag, to have an analysis made, for which a fee of £1 11s. 6d. will be charged.—*B. C. Aston.*

SILVER-BEET.

ITS USE AS A FORAGE CROP.

A. MACPHERSON.

THE phenomenal success which has attended the introduction of silver-beet is naturally attracting the attention of farmers in all parts of the Dominion. Its freedom so far from insect pests and fungoid diseases, its great prolificacy in producing a wealth of stem and leaf (giving quite six feedings-off with sheep in twelve months' time from date of first feeding), its resistance to drought and severe frosts, its apparent freedom from causing scour or bloat in sheep, the appreciation of all classes of farm stock for it (trials having proved that it is relished before rape, kale, or roots), the enormous tonnage of succulent forage it produces, and its fairly high feeding-value place it in the forefront of all other forage or root crops grown for stock in this country at the present time. The remarkable results obtained last year in the growing and feeding capabilities of silver-beet with sheep at the Canterbury Frozen Meat Company's experimental farm at Belfast, and at other farms in the South Island where co-operative field experiments have been conducted, prove in a practical way its possibilities for the feeding and fattening of all farm-animals. At Belfast a quarter of an acre was sown with silver-beet on the 9th October, 1911, and was ready to feed off in the last week in February, 1912. Owing, however, to a flush of other feed, the silver-beet was not stocked until the 12th March, 1912, from which date till the 1st March, 1913, it was stocked at intervals with sheep, and fed off six times. The results from this quarter-acre show that one acre would approximately carry 1,014 sheep for eighty-four days. The weight of stems and leaves was 218 tons per acre, this weight of forage being produced within twelve months from the date of first stocking. It should be emphasized that the plants were by no means exhausted after the sixth feeding, and would have continued to give further feedings but for the fact that too long a period had been allowed to elapse between one or two of the foldings. Some of the plants had thereby thrown out seed-stalks, with the result that their feeding-value for subsequent growth was impaired. It was therefore decided not to keep further records.



SILVER-BEET ROOTING-SYSTEM.

From photograph of plant after having been eaten down eight times.

Specimens of the first growth of stems and leaves of four varieties sown last spring were analysed by Mr. Aston, Chief Agricultural Chemist, to ascertain their dry-matter content. This was found to average about 8 per cent. Specimens of a later growth of stems and leaves from the same varieties will have to be analysed before the percentage of dry matter can be ascertained with any degree of certainty. It may be assumed, however, that the average of 8 per cent. will be maintained, if not exceeded, as the stems of two varieties submitted were not fully developed. Taking the approximate yield at Belfast last year of 218 tons per acre, and the average dry-matter content at 8 per cent., it will be seen that a yield of 17.44 tons of dry matter per acre was secured within the twelve months.

The value of silver-beet in the fattening of sheep was further demonstrated by several feeding tests conducted this year. In two instances the sheep put on at the rate of 1 lb. a day live weight on the silver-beet.

CULTIVATION OF CROP.

As farmers in general are not acquainted with silver-beet as a forage crop, it is desirable that full details be given as to the correct procedure in preparing the land, and of the subsequent management of the crop. In the first place it should be clearly understood that, whilst splendid results can be obtained from the plant in the feeding of stock, silver-beet is a crop that demands very careful treatment—indeed, more careful treatment than any other crop of a similar nature. While silver-beet has done very well on rather unpromising soils and in unfavourable locations, the best results will only be obtained where the soil is good and is well prepared for the crop. Then, when the crop is developed inter-cultivation is imperative, for it must be remembered that it is not the value of the first year's crop which determines the economical importance of silver-beet, but rather the many subsequent crops which well-nourished plants carefully managed afford at subsequent seasons of the year.

Silver-beet appreciates a deep loam, well cultivated, and free from other plant-growth. It should be sown in spring, when the ground is warm, and again in the autumn. From 6 lb. to 8 lb. of seed per acre, sown in drills 21 in. apart, should be employed. The seeds should be steeped for twenty hours in cold and clean water prior to sowing. Experiments have indicated that it is desirable to sow the seed on the flat—this in order to prevent stock from eating the plants too deeply down, which is always a danger with the plants sown in raised rows, when through the tramping of the stock too much of the root portion of the plant is exposed and eaten. The plants should be thinned out to about 12 in. in the row. If there are



No. 1.—SWISS CHARD (SILVER-BEET).



No. 2.—SWISS CHARD (SILVER-BEET).

blanks in the rows the plants will stand transplanting; but this should be done immediately before, during, or after rain.

Mangel-manure is a suitable fertilizer, and should be applied at the rate of about 3 cwt. to the acre. As it is impossible to definitely state what manure is necessary for the crop in all soils and situations, the farmer must decide this matter for himself by discovering the manurial requirements of his particular soil. The following mixtures are recommended to the growers of silver-beet, for testing the question, by Mr. B. C. Aston, Chief Agricultural Chemist:—

Plot 1: 1 cwt. superphosphate, 1 cwt. Island guano, $\frac{1}{4}$ cwt. seed gypsum, per acre.

Plot 2: $1\frac{1}{2}$ cwt. superphosphate, 2 cwt. Island guano, per acre.

Plot 3: No manure (one row).

Plot 4: 1 cwt. superphosphate, $\frac{1}{2}$ cwt. Island guano, $\frac{1}{2}$ cwt. dried blood, $\frac{1}{4}$ cwt. seed gypsum, per acre.

Plot 5: 1 cwt. superphosphate, $\frac{1}{2}$ cwt. Island guano, $\frac{1}{2}$ cwt. dried blood, $\frac{1}{4}$ cwt. sulphate of potash, per acre.

To secure a good crop, inter-cultivation should be given until the plant is well established, as silver-beet will stand eating off several times. It is desirable immediately after each feeding is completed to run a cultivator between the rows, provided the land is in a fit condition to do this. After the first feeding it is advisable, judging from observations made, to slightly cover the stem of the plant with soil to a depth of 1 in. to 2 in. In the winter this will give the necessary protection to the roots and to the young springing shoots. Of course, after the colder weather is over this protection is not necessary.

MANAGEMENT OF THE CROP.

I have already pointed out that silver-beet demands careful management. Certain lessons in co-operative experiments in the South Island afford a good idea of the procedure in feeding off, &c. Let the farmer never make the mistake of growing more silver-beet than he can effectively control and feed off completely at the right periods. It is a crop that cannot be neglected or trifled with. It is, indeed, only when silver-beet is managed to the best advantage that its great value as a forage crop is realized. Care must be taken not to allow the plant to seed.

The crop is generally fit for feeding in about four months from sowing. Immediately the outer leaves show an indication of taking on a yellow tinge the crop should be stocked, and here comes in the

first danger. The procedure in carrying out the feeding-off process depends upon the number of sheep to be fed. In the first place, the break should enable the beet to be fed off in seven to nine days, or in a shorter period if possible. Therefore the break should always be



No. 3.—SWISS CHARD (LUCULLUS).

a comparatively small one. This is necessary, for the reason that the plant shoots away very rapidly after being eaten down, and should stock remain a day too long they would eat the young shoots coming away, and therefore retard the second growth.

I might mention here that the principal feeding-off of silver-beet is not obtained in the first but in the following season. Therefore the main object of the grower should be to nurse and conserve the crop, in order that the most valuable forage to be secured in a subsequent season may be as abundant as possible. Say the first feeding has taken place in March, then the second feeding should be obtained in June. The plant will continue to grow throughout the winter, and



NO. 4. PERPETUAL SPINACH-BEET.

in the spring provides its best and most abundant forage. It is at this time of the year that silver-beet shows up to the greatest advantage. But even with the remarkable spring feed it affords, silver-beet if properly managed will again provide good feed about the following March, and again in midwinter—a fact proved by the experience at Belfast, where the 1911-sown crop provided excellent feed in March of this year, and is ready this month again for another feeding.

VARIETIES.

Some disappointment has been experienced by growers of silver-beet, who have not gained anything like the results obtained in the co-operative experiments in the South Island. The cause in the majority of cases is the growing of the wrong varieties. In commerce there are eight varieties of Swiss chard, or silver-beet. Four varieties have been tested in the South Island experiments, and these are herewith illustrated.

(1.) Swiss chard (silver-beet) has a plain dark-green leaf, with broad wide stems and thick midrib. The plant illustrated was not fully matured at the time the photograph was taken. This variety is undoubtedly the best of the four tested, and is the one to be de-



SHEEP ON SILVER-BEET AT RUAKURA EXPERIMENTAL FARM.

pended upon to give the results referred to above. It is also remarkable for its greater vitality and longer life than the other varieties. It can therefore be relied upon to give a larger number of feedings before becoming exhausted.

(2.) Swiss chard (silver-beet) has a light-green leaf, with broad stem and a thick midrib. It is the second-best variety. The plant photographed was not fully matured.

(3.) Swiss chard (lucullus): Although this gives a wealth of stem and foliage, it apparently is not so well liked by stock, nor will it give the continuous crops that No. 1 will furnish.

(4.) Perpetual spinach-beet: This variety is being tried for the first time. It may prove successful in some localities, but so far it does not approach No. 1 as a fodder plant.

REGRASSING DEPLETED AREAS.

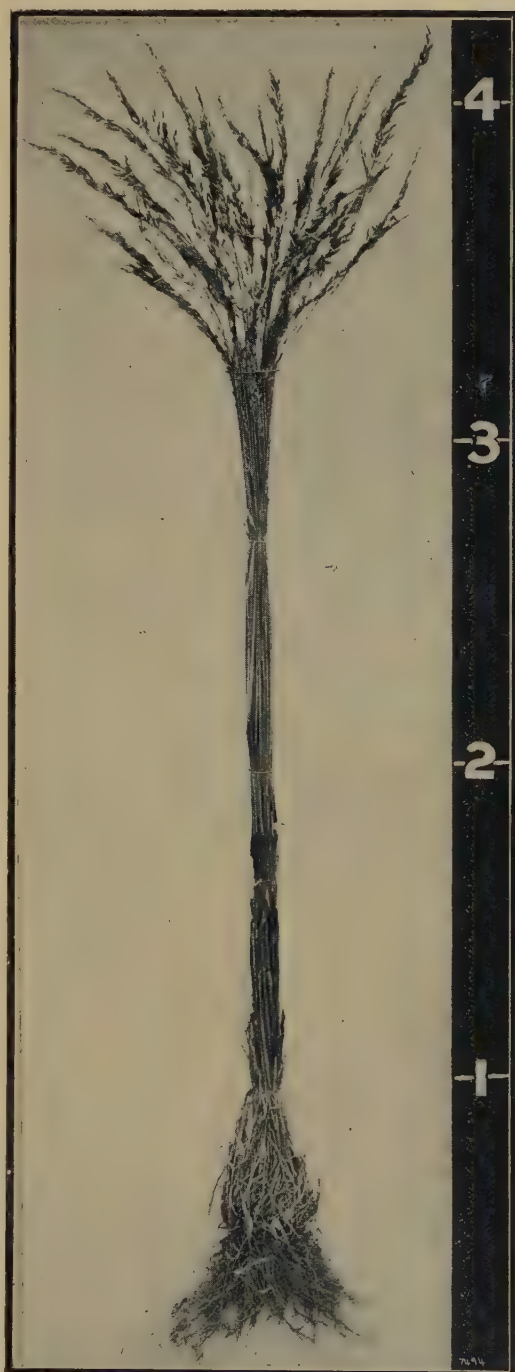
OF about seventy varieties of grasses, clovers, and other deep-rooted plants being tested for the re-vegetating of grass-denuded areas in the South Island, the tall oat-grass promises to be the most successful grass for the end in view. It has grown vigorously, and has stooled out well. A photograph of the grass on the following page will give some idea of the splendid growth it has made, the specimen being fully 4 ft. in height from the root-system to the seed-head.

Mr. J. Montgomery, the well-known seed-merchant of Christchurch, has forwarded the following communication to Mr. A. Macpherson, the officer in charge of the co-operative field experimental work in the South Island:—

“ I recently visited the experimental grounds at Lindis Crossing, Central Otago, and thought you might be interested to hear some of the results from an unofficial source.

“ The most remarkable result, to my mind, was the growth of the *Avena elatior* (tall oat-grass). This seems to show a better growth on this class of soil than any other variety of grasses sown. I think that, in view of the fact that this district is very dry in certain parts of the year, the experiments would be worth continuing. Evidently the chief trouble with the soil on the Morven Hills Estate is that, the vegetation having been eaten up by rabbits for a series of years, there is no appreciable humus left in the soil. The first consideration is to get some vegetable plants to grow which will regenerate the soil. Lettuce, chicory, and sheep's burnet all seem to do well, and cocksfoot, as usual, shows better growth than any of the finer grasses, though not so good as *Avena elatior*. The experiments there have been very carefully conducted, but, owing to those in charge having to rely on local farmers for horses and implements, they were unable to get the seeds sown at the right period of the year, consequently many of the experiments were not of much value. If the best work is to be got out of these experimental plots a team of horses and implements should be provided.

"The oats have not shown up very well, being sown too late. The Garton varieties, if anything, promise the best results. It seems a pity that this district should be depleted of all vegetation. I feel sure that this soil is capable of growing root crops, and well worth some expense to determine the most suitable grasses for the district. Rabbits, of course, have complete control at present, but could be exterminated under systematic methods of poisoning and trapping. That this district is capable of carrying a large quantity of stock is obvious from examination of some plots of land on the Queensbury side, where rye-grass and clovers are growing luxuriantly under irrigation."



IMPORTATION OF FERTILIZERS.

B. C. ASTON, F.I.C.

THERE are several interesting facts to be learnt from a study of the figures showing the yearly importations of fertilizers.

Looking at the respective quantities imported at the different ports, one is first struck by the enormous quantities of phosphate landed at the Port of Auckland. Thus, in the purely phosphatic manures (amongst which bone is included), Auckland imports as much (36,000 tons) as all the South Island ports, although there are two facts which somewhat discount this statement—viz., (1) that Dunedin possesses a phosphate-field and produces a considerable amount of phosphatic fertilizer, which does not therefore appear in these figures; (2) that the fertilizer imported into Otago (Dunedin) and Southland (Invercargill) is largely guano, which is much richer in phosphoric acid than either basic slag, bonedust, or superphosphate, the kinds of fertilizers mostly imported into the northern ports. But, making due allowance for these two facts, the amount of phosphates imported into Auckland is far greater than anything one can compare it with elsewhere in the Dominion. This great need of Auckland for phosphate, be it observed, is coincident with a paucity of available phosphoric acid in the majority of the soil-samples which have been analysed from that province (see *Journal of the Department of Agriculture*, Vol. iii, No. 4, p. 304, "Some Typical Auckland Soils," by B. C. Aston).

Considering the respective qualities of the different phosphates employed, it is seen that the soluble and quick-acting forms* of phosphate are more in favour in the northern parts, while the insoluble or slower-acting are more in demand in the extreme south. Thus the North Island ports, together with Lyttelton and Timaru, imported 64,700 tons of phosphates, of which only 18,300 tons were bonedust and guano; whereas Dunedin and Invercargill imported 21,000 tons, of which 15,700 tons were bonedust and guano, about 14,000 tons being guano. The reason that guano and ground rock phosphate are so abundantly used in Otago and Southland is well worth investigating.

On the relative merits of slag and superphosphate it is interesting to note that New Plymouth imports more slag than superphosphate,

* Bonedust would be quicker-acting on an Auckland soil than on a Southland soil, and hence might possibly be classified as a slow manure in the south.

and this disproportion will probably be much greater in future years, the Taranaki climate being exceedingly moist and the soil responsive to slag treatment. At Napier, on the opposite coast, the port for the Hawke's Bay District, the climate and soil of which is much drier than that of Taranaki, and the country often calcareous—conditions favouring the use of superphosphate—the imports of superphosphate are more than twenty times greater than those of slag. The same is true of the even drier climate of Canterbury (Lyttelton and Timaru ports).

A fact most worthy of close attention is that for the whole Dominion only 969 tons of purely nitrogenous fertilizers (valued at £12,816) were imported. A considerable quantity of this was probably not used as a fertilizer, but for manufacturing such articles of commerce as ammonia solution and nitric acid.

Of potash fertilizers, 4,248 tons, valued at £24,627, were imported.

The following particulars of the importation of fertilizers into New Zealand for the year ended 31st March, 1913, are compiled from returns furnished by H.M. Customs. The port of entry, name and quantity of fertilizer, and country whence imported, respectively, are shown.

AUCKLAND.

- Bonedust*.—Victoria, 335 tons; New South Wales, 4,786 tons; Bengal, 1,910 tons.
- Bone Char*.—New South Wales, 487 tons.
- Blood Manure*.—New South Wales, 20 tons.
- Blood and Bone*.—New South Wales, 150 tons; Victoria, 150 tons.
- Bone Phosphate*.—New South Wales, 31 tons.
- Basic Slag*.—United Kingdom, 6,655 tons; Germany, 478 tons; Belgium, 5,756 tons.
- Superphosphate*.—United Kingdom, 3,965 tons; Victoria, 25 tons; New South Wales, 44 tons; Germany, 1,225 tons; Belgium, 939 tons; Japan, 1,115 tons.
- Phosphates*.—United Kingdom, 3 tons.
- Guano and Rock Phosphate*.—New South Wales, 80 tons; Christmas Island, 6,200 tons; Seychelles, 1,500 tons; Ocean Island, 92 tons; Society Islands, 1,260 tons; Germany, 5 tons.
- Sulphate of Potash*.—New South Wales, 38 tons; Germany, 388 tons.
- Muriate of Potash*.—Germany, 20 tons.
- Kainit*.—United Kingdom, 31 tons; Germany, 655 tons; Belgium, 60 tons.
- Phonolite*.—Belgium, 3 tons.
- Gypsum*.—South Australia, 1,235 tons.
- Sulphate of Ammonia*.—New South Wales, 56 tons.
- Nitrate of Soda*.—Victoria, 41 tons; New South Wales, 202 tons.
- Nitrolim*.—Norway, 11 tons.
- Sulphate of Iron*.—United Kingdom, 25 tons.
- Potato Fertilizer*.—United Kingdom, 50 tons.

KAIAPARA.

- Bonedust*.—New South Wales, 43 tons.

NEW PLYMOUTH.

- Bonedust*.—New South Wales, 200 tons; Bengal, 210 tons.
- Basic Slag*.—United Kingdom, 823 tons.
- Superphosphate*.—United Kingdom, 100 tons; Victoria, 129 tons; New South Wales, 250 tons; South Australia, 90 tons.

NEW PLYMOUTH—*continued*.

Guano and Rock Phosphate.—New South Wales, 49 tons; South Australia, 125 tons.

Sulphate of Potash.—United Kingdom, 55 tons.

Nitrate of Potash.—United Kingdom, 20 tons.

Kainit.—United Kingdom, 40 tons.

Gypsum.—South Australia, 339 tons.

PATEA.

Superphosphate.—United Kingdom, 30 tons.

Gypsum.—United Kingdom, 40 tons; South Australia, 25 tons.

WANGANUI.

Guano and Rock Phosphate.—United Kingdom, 1 ton.

Gypsum.—Victoria, 12 tons; South Australia, 5 tons.

POVERTY BAY.

Basic Slag.—United Kingdom, 20 tons.

Superphosphate.—Victoria, 10 tons; Belgium, 10 tons.

Kainit.—United Kingdom, 5 tons.

NAPIER.

Basic Slag.—United Kingdom, 175 tons; Germany, 50 tons.

Superphosphate.—United Kingdom, 425 tons; Victoria, 108 tons; New South Wales, 185 tons; Japan, 1,825 tons.

Phosphates.—United Kingdom, 110 tons; South Australia, 20 tons.

Guano and Rock Phosphate.—United Kingdom, 2 tons; New South Wales, 25 tons.

Sulphate of Potash.—United Kingdom, 16 tons; New South Wales, 2 tons; Germany, 10 tons.

Kainit.—United Kingdom, 1 ton; Germany, 125 tons.

Potash Manure.—Germany, 60 tons.

Gypsum.—Victoria, 20 tons; South Australia, 70 tons.

Sulphate of Ammonia.—New South Wales, 10 tons.

Nitrate of Soda.—New South Wales, 2 tons.

Nitrolim.—Sweden, 3 tons.

WELLINGTON.

Basic Slag.—United Kingdom, 4,393 tons; Germany, 515 tons; Belgium, 225 tons.

Superphosphate.—United Kingdom, 1,447 tons; Victoria, 1,837 tons; New South Wales, 373 tons; Tasmania, 25 tons; Germany, 612 tons; Belgium, 213 tons.

Phosphates.—United Kingdom, 90 tons; Belgium, 30 tons.

Guano.—Victoria, 50 tons.

Sulphate of Potash.—United Kingdom, 16 tons; Germany, 77 tons.

Kainit.—United Kingdom, 90 tons; Germany, 405 tons.

Phonolite.—Germany, 2 tons.

Gypsum.—Victoria, 512 tons; New South Wales, 75 tons; South Australia, 405 tons.

Sulphate of Ammonia.—New South Wales, 21 tons.

Nitrolim.—Norway, 55 tons.

Castor Meal.—Bengal, 7 tons.

Turnip-manure.—United Kingdom, 75 tons.

Rape-manure.—United Kingdom, 75 tons.

Jadoo.—United Kingdom, 2 tons.

NELSON.

Basic Slag.—United Kingdom, 79 tons; Germany, 125 tons.

Superphosphate.—United Kingdom, 171 tons.

Guano.—Victoria, 20 tons.

Sulphate of Potash.—Germany, 10 tons.

Kainit.—Germany, 40 tons.

Gypsum.—Victoria, 21 tons.

Sulphate of Ammonia.—New South Wales, 12 tons.

BLENHEIM.

Superphosphate.—Victoria, 11 tons.

LYTTLETON.

Bonedust.—New South Wales, 25 tons.

Basic Slag.—United Kingdom, 350 tons; Germany, 50 tons.

Superphosphate.—United Kingdom, 1,305 tons; Victoria, 1,489 tons; New South Wales, 502 tons; Tasmania, 1,231 tons; Japan, 2,219 tons.

Phosphates.—United Kingdom, 140 tons.

Sulphate of Potash.—United Kingdom, 5 tons; Germany, 40 tons.

Muriate of Potash.—United Kingdom, 1 ton.

Kainit.—United Kingdom, 165 tons; Germany, 75 tons.

Potash.—United Kingdom, 95 tons.

Gypsum.—New South Wales, 100 tons; South Australia, 20 tons.

Nitrolim.—United Kingdom, 10 tons.

TIMARU.

Bonedust.—Bengal, 135 tons.

Basic Slag.—United Kingdom, 51 tons; Belgium, 105 tons.

Superphosphate.—United Kingdom, 2,640 tons; Victoria, 978 tons; New South Wales, 10 tons; Germany, 125 tons; Belgium, 50 tons; Japan, 1,471 tons.

Guano.—New South Wales, 74 tons; Madagascar, 1,575 tons.

Sulphate of Potash.—Germany, 35 tons.

Kainit.—Germany, 200 tons.

Potash Manure.—Germany, 75 tons.

Gypsum.—New South Wales, 5 tons; South Australia, 150 tons.

Insecticide Fertilizer.—United Kingdom, 30 tons.

DUNEDIN.

Bonedust.—New South Wales, 82 tons; Bengal, 175 tons.

Broken Bones.—New South Wales, 133 tons.

Blood and Bone.—New South Wales, 467 tons.

Basic Slag.—Germany, 50 tons.

Superphosphate.—United Kingdom, 225 tons; Victoria, 415 tons.

Guano.—Victoria, 1 ton; Malden Island, 2,686 tons; Christmas Island, 1,100 tons; New Caledonia, 1,413 tons.

Sulphate of Potash.—United Kingdom, 80 tons; Germany, 75 tons.

Muriate of Potash.—Germany, 2 tons.

Kainit.—United Kingdom, 25 tons; Germany, 125 tons.

Potash.—Germany, 185 tons.

Gypsum.—South Australia, 800 tons.

Sulphate of Ammonia.—New South Wales, 15 tons.

Nitrate of Soda.—Victoria, 89 tons; New South Wales, 30 tons.

Nitrolim.—Norway, 42 tons.

Potato-manure.—United Kingdom, 100 tons.

Turnip and Grass Manure.—United Kingdom, 100 tons.

Non-odorous Fertilizer.—New South Wales, 5 tons.

INVERCARGILL.

Bonedust.—New South Wales, 55 tons; Bengal, 1,325 tons.

Bone Char.—Bengal, 40 tons.

Blood and Bone.—New South Wales, 968 tons.

Basic Slag.—United Kingdom, 100 tons; Germany, 50 tons; Belgium, 83 tons.

Superphosphate.—United Kingdom, 200 tons; Victoria, 1,393 tons; New South Wales, 250 tons; Belgium, 297 tons; Holland, 3,000 tons.

Bernard's Phosphate.—Holland, 502 tons.

Guano.—Christmas Island, 2,449 tons; Malden Island, 2,597 tons; Seychelles, 1,400 tons; New Caledonia, 1,170 tons; Surprise Island, 1,159 tons.

Kainit.—United Kingdom, 25 tons; Germany, 400 tons.

Potash Manure.—United Kingdom, 75 tons; Germany, 415 tons.

Phonolite.—Germany, 1 ton.

Gypsum.—Victoria, 29 tons; South Australia, 300 tons.

Sulphate of Ammonia.—United Kingdom, 100 tons; New South Wales, 160 tons; Germany, 65 tons.

Nitrolim.—United Kingdom, 10 tons; Sweden, 5 tons; Norway, 10 tons.

SUMMARY.

The following is a summary of the kinds, quantities, and values of the various fertilizers imported into New Zealand during the year ended 31st March, 1913:—

Description.	Weight.		Value.	
	Year 1912-13. Tons.	Year 1911-12. Tons.	Year 1912-13. £	Year 1911-12. £
Bonedust	9,281	10,799	60,050	69,032
Broken bones	133	..	766	..
Bone char	527	275	869	922
Blood manure	20	175	130	1,050
Bone phosphate	31	240	109	817
Blood and bone	1,735	635	10,344	3,924
Basic slag	20,133	16,227	66,389	53,067
Superphosphate	32,964	32,567	120,303	119,597
Phosphate, n.o.e.	393	690	1,459	2,537
Guano and rock phosphate	25,033	22,050	65,084	61,622
Bernard's phosphate	502	..	1,598	..
Sulphate of potash	847	796	10,432	9,772
Muriate of potash	23	20	277	234
Nitrate of potash	20	..	241	..
Kainit	2,467	2,187	8,339	7,255
Potash salts	905	916	5,554	5,235
Phonolite	6	..	25	..
Gypsum	4,163	5,494	6,687	7,604
Sulphate of ammonia	439	304	6,962	4,505
Nitrate of soda	364	258	4,164	2,725
Nitrolim (calcium cyanamide)	146	60	1,560	626
Sulphate of iron	25	63	122	217
Potato-fertilizer	150	225	865	1,168
Turnip-fertilizer	75	270	350	1,140
Turnip and grass fertilizer	100	..	520	..
Rape-fertilizer	75	..	360	..
Insecticide fertilizer	30	..	167	..
Non-odorous fertilizer	5	..	78	..
Jadoo	2	..	16	..
Castor meal	7	..	437	..
	100,601		£374,257	

Importations for year ended 31st March, 1912, 94,296 tons, £353,327.

The Government has granted a sum of from £20 to £25 in order to enable experiments in top-dressing to be carried out in the Akitio County, with the object of ascertaining if a remedy can be discovered for osteomalacia, which has been appearing in lambs in that district this season.

RE-VEGETATING EXPERIMENTS IN SOUTH ISLAND.—Included in the varieties recently despatched from Ruakura Farm of Instruction to Central Otago for re-vegetating experiments is a grass commonly known as buck-bare (*Sporobolus argutus*). This is the first time it will be tested under ordinary field conditions in this country. Judging by its hardiness, habit of growth, quantity of feed thrown, resistance to insect and fungoid diseases, there is every probability of its becoming a valuable grass under certain conditions. Frosts at Ruakura Experimental Farm do not affect it, but the heavier frosts in Central Otago may prove too severe for it. As this grass is a native of the lower altitudes of Brazil, it may not prove sufficiently hardy for Central Otago conditions.—A. W. Green.

THE "JOURNAL OF AGRICULTURE."

WITH this issue the *Journal of Agriculture* enters upon the fourth year of its existence. It is now a firmly established and effective link between the Department and the farmers of the Dominion. That it is appreciated by those in whose benefit it is issued is proved by the fact that there are now 10,618 subscribers, while 1,050 copies go to reading-rooms and libraries, foreign Departments of Agriculture, experimental stations, and investigators in agricultural science in all parts of the civilized world. It has been most encouraging to officers associated in the production of the *Journal* to have received so many complimentary and encouraging letters from subscribers, a large number of whom have taken an active, and much appreciated, interest in widening the circle of readers. The present satisfactory position of the *Journal* is principally due to the splendid co-operation of the different divisions of the Department, the leading members of which have liberally contributed to its pages. In extending the circulation of the *Journal*, a number of officers of the Department have rendered conspicuous service. While the present position of the *Journal* is very satisfactory, in view of its youth and that the subscription list has been mainly built up on a voluntary basis, there are still many farmers in the Dominion who have to be made acquainted with it; and in this important work readers can render the Department good service, as so many have already done, by bringing it under the notice of neighbours and friends.

"As a result of the experiments your Department is carrying on from year to year I have been able to quadruple my income since the year 1907."
—Extract from letter from Mr. John Dowd, Waiau, North Canterbury, to Mr. A. Macpherson, Supervisor, Co-operative Field Experiments, South Island.



A GOOD FODDER FOR STOCK.

W. C. BERRIDGE.

To provide green feed quickly during the middle of summer, when pastures are failing, is a vexed problem for the farmer, especially in dairying districts. Those who have a good lucerne patch are largely independent of adverse weather-conditions, as the lucerne, being a deep-rooted plant, makes its best growth during that season. Farmers who have forethought enough to provide green maize for their cows are also in a better position to face a dry season.

Those who for various reasons may not have green feed provided for the middle of summer should try a plot of Hungarian millet. This makes a rapid growth during the hottest weather, independent of rain. Hungarian millet should be cut before the seed-heads shoot, as it is then in its most succulent stage.

All live-stock seemed fond of the millet, both horses and cows eating it readily when first offered. Being succulent, there was little or no waste with it.

At the Tauranga Experimental Farm a piece of land, from which oats were cut last January, was ploughed, harrowed, and scarified, as it was very foul with sorrel and other weeds. Superphosphate, at the rate of 3 cwt. to the acre, was then broadcasted and harrowed in. The Hungarian millet was sown broadcast on the 28th January, at the rate of 12 lb. to the acre, and was covered with a chain harrow.

Though no rain fell for six weeks, the millet grew rapidly, and in ten weeks' time was ready to cut. It yielded at the rate of 17 tons to the acre. During the whole period of growth there were only two days on which rain fell.

A part of the plot was manured with half the quantity of superphosphate ($1\frac{1}{2}$ cwt. to the acre being applied), and this part yielded 40 per cent. less by weight.

Now that the millet is removed the land presents a very clean appearance, most of the weeds having been smothered by the dense growth.

After the millet was cut, the land was ploughed and sown with oats and vetches for spring feed.

FANCY - CHEESE MAKING.

ITS PROGRESS IN NEW ZEALAND.

MISS G. N. DAVIES, N.D.D.

UP to the present time the dairying industry in New Zealand has been chiefly confined to buttermaking and to one variety of hard-pressed cheese—viz., Cheddar.

As has already been stated in a previous article, the making of soft and fancy cheese is a most profitable industry. New Zealand offers an excellent field for the introduction of some of the numerous varieties of such cheese, from the small dainty cream cheese, only a few ounces in weight, to the large Cheshire, weighing 60 lb. or 80 lb. There is a growing demand for small cheeses of the soft variety, but the demand would increase enormously if only these were offered to the public in any quantity. Cheese is a good, wholesome, nutritious article of diet, and a good demand could easily be created. Two-thirds of a pound of cheese contains as large an amount of what laymen call the "muscle-forming" materials as a pound of beef of average composition. At the conclusion of some experiments carried on by the Department of Agriculture of Pennsylvania it was found that cheese was as easily digested as meat, and it may be used as a chief and a cheap article of diet; also that cheese compares favourably with other foods in thoroughness of digestion—that is, in the percentage finally digested.

For the manufacture of small cheese no expensive appliances are necessary, and the cost is nothing like as great as that for the equipment of a dairy or factory for the manufacture of Cheddar cheese. The process of making is not complicated or difficult to understand. As a side line in a cheese or butter factory, fancy-cheese making should prove a decided success, especially if in or near a large centre. In the making of soft cheese the ripening process is rapid, which means little loss of weight during ripening and a quick return financially. The work being light, interesting, and profitable, farmers should encourage their wives and daughters to take it up, as is done in most farmhouses in England. The cheeses likely to be the most popular are those weighing from 1 lb. to 2 lb. each, which in the first place is a size very suitable to the average householder, and presents a favourable appearance when placed on the table.

WHERE CHIEFLY MADE IN NEW ZEALAND.

Up to the present time fancy-cheese making has chiefly been taken up by the large dairy companies, and is now being made in Dunedin, Christchurch, Palmerston North, Wanganui, and Auckland.

There should be an exceedingly good market for this class of produce in Wellington, if only taken up thoroughly and made known to the public, the writer having on several occasions received inquiries as to where these small cheeses could be obtained.

As in the manufacture of soft cheese there is no very heavy work, and cheeses such as cream and club being small to pack and requiring to be made as attractive as possible in appearance, women are usually employed in this branch of work.

Dunedin.—One of the first places where the manufacture of soft and fancy cheese was taken up was at the main factory of the Taieri and Peninsula Milk Supply Company, in Dunedin. A special room has been fitted up for the purpose of fancy-cheese making only, and a young woman from England is employed in its manufacture. At this factory the manufacture of Stilton cheese has also been recently taken up.

Christchurch.—Again, in Christchurch the manufacture of different varieties of soft cheeses is carried on by the Central Dairy Company at their factory in Addington. The soft-cheese department is well fitted up and the work carried on by two young women who had had previous experience at Home. The popular size of a cheese in different places seems to differ. Here a cheese weighing about $2\frac{1}{2}$ lb. seems to be in general favour.

Palmerston North.—In Palmerston North fancy cheeses are made at one of the factories of Messrs. J. Nathan and Co. at Whakaronga. The demand here is for a cheese just 1 lb. in weight. At this factory club cheese was taken up on a larger scale than at the others, and sold in small jars. This cheese when of standard quality is much appreciated by the general public, and in this attractive form is very suitable for the table or for picnics.

Wanganui.—In Wanganui the larger-sized varieties are made at the Westmere Cheese-factory, as well as cream and club, the last two named being also made by the Fresh Food and Ice Company.

Auckland.—In the north the manufacture of soft cheese is carried on at the butter-factory of Messrs. Ambury Limited, of Auckland, the cheese being made by the manageress of the humanized-milk department and her assistant. Cream cheese is made a specialty here, and finds a ready sale in all the dairy shops belonging to the firm.

Cream and club cheeses are also made by Mrs. Hesketh, at Manurewa, for the Auckland market.

STILTON AND CHESHIRE.

Besides Stilton, of the larger varieties the manufacture of Cheshire has been taken up. This latter variety has been made by Messrs. J. Nathan and Co., also by Mr. C. J. Billington at his factory at Pongaroa. It is a very suitable variety for manufacture in New Zealand, the size of the cheese being the same as a small Cheddar, and the only essential difference in the utensils is the moulds or hoops. This is a cheese which has a large sale in England, and is certainly more profitable than Cheddar, the weight of cheese from a given quantity of milk being decidedly higher.

There are districts still in New Zealand where the manufacture of these cheeses has not yet been taken up, and where there would without doubt be a good market for them if they were only made and brought before the public. In a place like New Plymouth there should be a ready sale for them, but up to the present they have not been tried in Taranaki. In the Wairarapa, too, there should be a considerable sale, but they have yet to be introduced to this district.

DIFFERENT VARIETIES OF CHEESE.

There are many different varieties of cheese and kinds to suit all tastes, whether full-flavoured or mild, hard, soft, or containing blue-mould. They can all be placed under three different headings—viz., hard-pressed, blue-veined, and soft.

CHEESE FOR EXPORT.

As there are only about a million people in New Zealand, certainly not enough to consume all the cheese of any kind which can be made in the country, it would without doubt prove very profitable to manufacture different varieties of cheese for export in addition to Cheddar, especially the kinds which would command a much higher value. A variety of cheese which commands a very high price is Stilton, few of which are made in New Zealand, and some of which are imported. Why not manufacture the most expensive kinds, and import, if necessary, the cheaper varieties? Stilton cheese comes under the heading of "blue-veined," and, besides being made for sale in New Zealand, should easily bear transit. Another of the same variety which could be made for export is the Stilton-shaped "Wensleydale," the process of manufacture being shorter than that of Stilton, and the price of the finished article much the same.

Another variety which should easily bear transit, and has a very good sale in Wales and the west of England, is Caerphilly. This cheese is not very big, and, the process of manufacture not being

difficult, it should find a ready sale in New Zealand, besides being suitable for export.

Then there is the Cheshire variety already mentioned. This cheese in size and appearance is very like Cheddar. The time of ripening depends on the process followed, and it can be made to ripen quicker than Cheddar. The texture is more open, and, unless the long-ripening method is followed, more moisture is retained, a greater weight of cheese resulting.

The above-named are considered the most suitable for export, but up to the present only Stilton and Cheshire are being taken up in this country.

Among the smaller varieties, Miniature Wensleydales and Little Welsh, if made to weigh, say, 2 lb. in weight, should be suitable for export, if carefully packed and not sent away when too green. If made smaller than the above-mentioned size their tendency would be to get too dry. The profit on any of the above-mentioned varieties would compare most favourably with the profit made on Cheddar cheese.

If the smaller varieties of soft and cream cheeses were only taken up by farmers' wives and daughters on the farm, where they can be made in small quantities, the best possible article could be produced, because the milk can be properly controlled right from its source: a ready sale would assuredly be found in the local towns, and the business would be found to pay handsomely.

If the manufacture of the other varieties mentioned in this article were taken up more at the different factories, both for local consumption and for export, they would be found most profitable. By shipping direct to the Old Country a trade would at once be opened up which would assuredly prove highly beneficial to every one concerned.

Lime and lime without manure
Makes both farm and farmer poor,

BUT

Lime, manure, and vigorous clover
Make the old farm rich all over.

—*Dr. Vivian, of the Ohio Agricultural College.*

DO not leave the preparation of the land till the crop is to be planted. Have everything ready, so that immediately a good seeding-time comes the crop may be put in at once under the most favourable conditions. Inability to take advantage of suitable planting-conditions is responsible for most of the failures in cropping operations.

SILAGE.

THE STACK SYSTEM.

W. DIBBLE.

IN this favoured country, where there is not generally the necessity to stall-feed cattle in the winter, the preparation of silage in specially constructed silos does not appeal to the farmer in the same way as it does in those countries where the winters are severe and the feeding of cattle under shelter is imperative. Therefore silage in the stack form is the method favoured, and is the system which will prove more acceptable to the majority of our farmers. Especially to the dairy-farmer and grazier on medium and large holdings will stack silage appeal. In this form, with the preserved plant complete, it can be thrown out on to the fields, and the work of feeding be thus accomplished with as little delay and loss of time as possible. The feeding of silage in the fields presents a distinct advantage, in that the one objection to silage from the milk-producer's view-point—liability to taint milk—is removed. I have fed stack silage for seventeen years to cows milked for a city trade without receiving a single complaint in regard to the flavour of the milk, but the silage was always fed in the field and after milking. On the other hand, when the material for silage has been chaffed for a silo, it must be fed in troughs. Where every care has been taken to secure only a sweet silage this can be fed in the milking-shed without endangering the milk-flavour; but generally there is a risk in feeding it in the same place where milk is handled. Thus it is always better to feed silage away from the milking-shed. Herein the stack form presents a decided advantage, as it can be thrown out on the ground, whereas taken from a silo (which is filled by chaffed fodder) feeding-troughs must be provided.

A great advantage of stack silage is that the stack may be built in any paddock, and at a point where it can be most conveniently used for feeding purposes.

But a few years ago the making of silage, even in the simple stack form, was regarded as work demanding special knowledge and experience on the part of the farmer. The many farmers throughout the Dominion who are now appreciating the value of ensilage have, however, found that there is little to master in making successful silage—in fact, that it is one of the simplest of farm operations.

The mere fact of making sure that the first 6 ft. or so of material—the section of the stack which constitutes the barometer in silage-making—is of the right heat, or, to be exact, that the correct degree of temperature (130° Fahr.) has been secured, is all that needs special attention. The remainder of the operation is so simple that any farmer can carry it out successfully by following simple printed instructions.

Grasses or fodder plants for silage should be cut when they are in the most succulent stage, or when approaching full bloom. Maize should be allowed to stand until the cob is formed and is in its dough stage. Crops for silage should not be allowed to wilt in the sun, but carting and stacking should proceed as soon as possible after cutting. To commence, cut six swaths from the boundary-fence. This will provide the first layer for the stack. After clearing up this, the work can be laid out so that each day a sufficient quantity, and a quick run to the stack, will be provided. There are two kinds of silage—viz., green and brown. For green silage the temperature required is from 130° to 140° Fahr.; for brown silage the temperature may be allowed to rise to 160°, but this form of silage is not recommended. Should a greater heat be attained the silage would be of little value. If the temperature does not reach 120° the product would be what is known as “sour” silage, which, though wholesome, is not usually considered so satisfactory as “sweet” silage, especially when intended for fodder for milking-stock. A cubic foot of silage should weigh from 45 lb. to 56 lb.

The silage will be greatly improved by the addition of salt, in the proportion of 1½ lb. to 1 ton of the green material.

THE SITE.

The location of the stack should be level, but at the same time should provide for effective drainage. It should be at some distance from the milking-shed, as, in the event of any portion of the stack being of a sour nature, the resulting odour will not affect the flavour of the milk. If available, a layer of straw 12 in. deep, or of rushes, should be provided for a foundation, but timber should never be used for the purpose, as this will admit the air, whereas the secret of silage-making is the exclusion of air. The stack should be set out square if of a small size—say, up to 14 ft. by 14 ft. for a 30-ton stack—but should be a little longer than the width if of a larger size, a stack containing from 50 to 60 tons occupying a space of 16 ft. by 18 ft., and larger stacks slightly longer than the width in about the same proportion.



LUCERNE SILAGE-STACK AT SUNNYSIDE MENTAL HOSPITAL, CHRISTCHURCH, CUT AT EIGHTEEN MONTHS FROM STACKING.

THE FIRST LAYER.

The whole success of the process of silage-making may be said to depend on the management of the first layer. The farmer should carefully study the instructions in regard to this before proceeding with the building of the stack, especially as local conditions and the season of the year largely influence the procedure to be adopted.

Much depends on the condition of the material to be made into silage. For instance, in the spring it may be of a rank succulent nature, whereas in the latter part of the summer it may be too ripe, and therefore rather dry for the purpose. In the former case it is difficult to get the heat up in the desired time, and sometimes it is necessary to wait a day or two to secure the desired temperature, whereas in the latter case it may be difficult to control the temperature. Where silage is being made on a large scale and the cost of labour is a consideration, a good plan where very succulent material is being handled is to start the work of stacking at the end of the week, so that the day of rest may be availed of to bring about the desired condition in the foundation of the stack before building is proceeded with. With dry material—of course, if succulence has quite disappeared silage-making is out of the question—the desired temperature in the foundation layer will be probably secured at once; and in dealing with this ripe fodder it is generally necessary to stack as rapidly as possible, and get the weight on without delay. Weight—provided by the silage material's own bulk and by the earth on top—is essential to stop the oxidation process when it has proceeded far enough, for if the oxidation (which takes place in the presence of air) continues the material will be burnt up and be useless.

The simplest method of ascertaining the temperature of the bottom layer is to insert perpendicularly a 1 in. galvanized-iron pipe in the centre of the stack, to within about 3 ft. from the ground. In this suspend a thermometer attached to a string. The bottom of the pipe will of course remain open, but the top end of the pipe must be closed by a cork. A cheap and fairly reliable thermometer, very suitable for the purpose, can be obtained from suppliers of dairy requisites, and probably may be secured from the nearest dairy factory.

BUILDING THE STACK.

In making the stack the ordinary procedure in stack-building should be reversed. Thus, instead of the centre being the highest part of the surface it should be lower, if anything, than the sides, the idea of this being that the sides press out to a level with the centre when weight is applied.

When the heat in the bottom layer has reached 130° Fahr. according to the thermometer stacking may be proceeded with. Remove the pipe while stacking is going on, and add to the stack at the rate of from 3 ft. to 6 ft. daily, building up the stack in as perpendicular a manner as possible. Under ordinary conditions this depth of material can be added to the stack day by day without the necessity of taking the temperature, providing the desired temperature of 130° has been attained in the foundation layer, but to make sure that the silage will be a success it is advisable to take the temperature every morning. In this case it is necessary, after each layer is added, to insert the pipe (in the centre and perpendicularly), suspend the thermometer in it, and cork up the aperture, in order to be able to ascertain the temperature on the following morning before proceeding with more stacking. Should the temperature be then found to be above 130° Fahr. stacking should proceed without delay, and a heavy layer be put on. Then, indeed, is the time to call upon all available energy to pile up the ensilage material on the stack. If, on the other hand, the temperature has not reached 130° Fahr. stacking should be delayed till the desired heat is recorded.

Where sheaves are used in the stacking process the sheaves should be double-banked at the corners, in order that these may be as solid as possible when the weight is applied.

HEIGHT OF STACK.

Even though there is a great subsidence in an ensilage-stack the height of the green material should not exceed about 20 ft. It should be remembered that the making of silage in the stack form is largely influenced by the prevailing winds. A strong wind blowing from one quarter will drive the heat through to the opposite side, with the result that the stack has a tendency to subside on the lee side. Therefore the higher the stack the greater the danger from this cause. If heavy winds are experienced while building, it is advisable to hang a tarpaulin over the side of the stack exposed to the wind. This will allow the stack to settle evenly. Of course, when the weight has been applied there is little or no danger from wind.

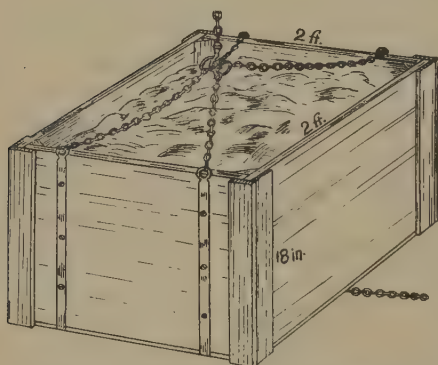


LUCERNE PLANT AFTER EIGHTEEN MONTHS IN SILAGE-STACK.

WEIGHTING.

The completed stack should be topped by a platform of rough timber provided with a ledge (18 in. to 20 in. deep) around the edges. This should be filled with soil taken from a trench around the stack. The simplest method of elevating the soil is to use boxes (as illustrated on this page) and carry them up by the hoist used for stacking.

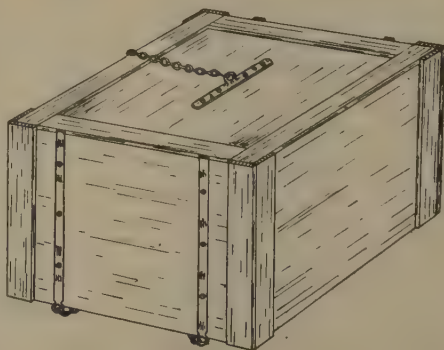
STACKING.



BOX FOR LIFTING SOIL FOR WEIGHTING.

There are several methods of conveying the material to the stack. A simply constructed sledge, about 8 ft. square, which any farmer can construct, is as good as anything. The runners should be made of 12 in. by 3 in. timber shod with iron, and the platform may be formed of 9 in. by 1 in. boards. Chains should be attached to the end of each runner, and centred in a ring for hitching to the haulage-tackle.

Two to three sledges should be provided—two if not more than a 20-acre paddock is being worked, and three if a large area is being cut. Alongside the stack two posts 12 ft. apart should be erected. The sledge of silage material should be taken in between these for unloading, the front of the load being level with the posts. Attached to one of the posts, 2 ft. from the ground, is a rope about 16 ft. long. This is passed in front of the load and just above the level of the flooring of the sledge, drawn taut, and hitched around the other post. The horses are then driven forward, and the load is left on the ground ready for hoisting. Where sheaves are being carted, slings are placed across the sledge when these are being loaded—one on the flooring, another on the first layer, and a third below the last layer. Then, when the sledge reaches the stack, the material is hoisted at once by means of the slings.



THE METHOD OF USING THE CHAIN FOR TIPPING OVER THE BOX.

For a small stack a simply constructed derrick is excellent, while, where a large stack is being constructed, the Manitoba hay-stacker is probably the more convenient.

STACK CAPACITY.

About 40 cubic feet of stack silage go to the ton. It may be taken as a fair average—allowing for the fact that the appetites of individual cows vary greatly—that 40 lb. of silage will be required for each cow. The farmer can therefore calculate the amount of silage he will require. In making this calculation, however, it is well to remember that silage in reserve is always a valuable asset—an insurance against drought and other adverse weather-conditions.

CUTTING OUT.

When the ensilage is required for use, sufficient boards may be removed to allow space for the hay-knife. The remainder of the roof will be undisturbed. The first cut should be about 6 ft. square.

COST OF PREPARATION.

The main argument urged in this country against silage is the cost of preparation. Certainly this is heavy where all the labour required has to be specially engaged for the purpose, though even then the expense is more than counterbalanced in those unexpected periods of weather-adversity when silage is the only thing that can be depended upon. In some districts where silage is appreciated a customary procedure is for neighbouring farmers to assist each other in the work. Thus silage can be made on three different farms at about the same time, on alternate days. Where this is done I would suggest that the plant be put in order during the off season of the year. Then, when the season for making the silage arrives, everything will be ready at the opportune time. Not only can economy be effected by co-operating on the actual work of stacking, but the greater part of the necessary plant may be purchased on the co-operative principle. The mower, binder, rake, sledges, and hoist can be moved from farm to farm, but I would always recommend each farmer to have his own hoist—a simple derrick will do. A great advantage in working on this principle is that there need be no loss of time in waiting for the temperature to rise, and as bad weather means very little delay the work can be completed in a very short space of time.

Over a hundred varieties of potatoes have been tested at Ruakura Farm of Instruction this season.

BUSH-SICKNESS INVESTIGATIONS.

C. J. REAKES, D.V.Sc., and B. C. ASTON, F.I.C.

IN the April issue of the *Journal* details were given of three cattle experiments which had given distinctly successful results. In addition to these experiments a number of others were at the same time carried out, these also consisting of the application of various top-dressings, sheep and a few cattle being afterwards grazed upon the treated pastures. While the sheep experiments did not, on the whole, yield such definitely good results as did those experiments limited to cattle alone, yet they proved of great value, and the interesting information obtained from them will, it is anticipated, greatly aid in overcoming the difficulty of bringing bush-sick lands into profitable use for pastoral purposes. It has been a recognized fact that sheep develop bush sickness much more readily than do cattle, and that the younger they are the more quickly the characteristic symptoms make their appearance when the animals are living on badly affected land, while on other slightly affected areas adult sheep can live and remain healthy, though lambs cannot be fattened for the lamb market or reared to maturity. On such areas cattle are often unaffected, though probably they do not develop so quickly, fatten so readily, or, in the case of milch-cows, milk so profitably as on normal land. Following are particulars of these additional experiments:—

SERIES No. 1.

Paddock No. 2, Te Pu; area, 2 acres. Top-dressed with quicklime, 1 ton per acre, November, 1910. Stocked with sheep sixteen months old.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
No. 1	8/1/11	..	Accidentally killed by a dog.
No. 2	8/1/11	29/9/11	Died of bush sickness on 8/11/11.
No. 3	28/3/11	16/7/11	Died of bush sickness on 2/11/11.
No. 4	30/4/11	2/10/11	Died of bush sickness on 13/2/12.
No. 5	30/4/11	2/10/11	Died of bush sickness on 13/2/12.

Sheep No. 3 had been on the untreated control paddock for over two months before being placed on this lime paddock.

Paddock No. 3, Te Pu; area, 2 acres. Top-dressed with superphosphate, 5 cwt. per acre, November, 1910. Stocked with wether sheep sixteen months old.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
No. 1 ..	8/1/11	..	Died from accident, 30/8/11.
No. 2 ..	8/1/11	8/10/11	Died, 10/11/11. } See below.
No. 3 ..	8/1/11	2/10/11	Died, 16/11/11. }
No. 4 ..	30/4/11	..	Removed in good health, 12/2/12.
No. 5 ..	30/4/11	..	Removed in good health, 12/2/12.
No. 6 ..	30/4/11	11/2/12	Died of bush sickness, 1/4/12.

Sheep Nos. 2 and 3 died a day or two after having been shorn, the weather being very cold and wet. Both were, however, affected with bush sickness, but under normal weather-conditions they would probably have lived some weeks longer.

Paddock No. 4, Te Pu; area, 2 acres. Top-dressed with basic slag, 10 cwt. per acre, November, 1910. Stocked with five wether sheep sixteen months old, and one ewe twenty-eight months old.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
No. 1 ..	8/1/11	..	Died through accident, 15/8/11.
No. 2 ..	8/1/11	..	Died through accident, 28/9/11.
No. 3 ..	8/1/11	8/11/11	Died of bush sickness, 25/11/11.
No. 4 ..	30/4/11	27/1/12	Died of bush sickness, 3/3/12.
No. 5 ..	30/4/11	6/2/12	Died of bush sickness, 29/4/12.
No. 6 (ewe) ..	30/4/11	6/2/12	Removed in good health, 12/2/12.

Paddock No. 5, Te Pu; area, 2 acres. Top-dressed with calcium nitrate, 2 cwt. per acre, November, 1910. Stocked with wether sheep sixteen months old.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
No. 1 ..	8/1/11	29/9/11	Died of bush sickness, 3/10/11.
No. 2 ..	8/1/11	24/10/11	Died, 10/11/11.
No. 3 ..	8/1/11	5/11/11	Died, 10/11/11.
No. 4 ..	30/4/11	..	Removed in good health, 12/2/12.
No. 5 ..	30/4/11	..	Removed in good health, 12/2/12.

Sheep Nos. 2 and 3 died after shearing, the weather being very wet and cold. Both were affected with bush sickness in a fairly advanced stage, but the inclement weather immediately after they were shorn hastened their death.

Paddock No. 6, Te Pu (control); area, 2 acres. No top-dressing. Stocked with wether sheep sixteen months old.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
No. 1 ..	8/1/11	..	Transferred to paddock No. 2, 28/3/11.
No. 2 ..	8/1/11	24/10/11	Died of bush sickness, 13/11/11.
No. 3 ..	8/1/11	5/11/11	Died of bush sickness, 3/1/12.
No. 4 ..	30/4/11	6/2/12	Died of bush sickness, 27/4/12.
No. 5 ..	30/4/11	6/2/12	Died of bush sickness, 16/5/12.
No. 6 ..	30/4/12	..	Removed in good health, 12/2/12.

SERIES NO. 3, AT MAMAKU.

Land partially cleared bush country with many stumps and fallen logs on surface. Surface-sown with cocksfoot and clover some years since.

Paddock No. 1; area, 2 acres. Top-dressed with ground limestone, 2 tons, and superphosphate, 5 cwt., per acre, November, 1910. Stocked with one steer about eighteen months old, and two wether sheep of about the same age.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Steer	19/4/11	..	Developed bush sickness end of December, 1912. Then removed to experimental farm and placed under medicinal treatment. Still at farm, and is improving.
Sheep No. 1 ..	8/1/11	2/12/11	Died from accident, 15/12/11.
Sheep No. 2 ..	8/1/11	31/10/11	Died from bush sickness, 15/12/11.

Paddock No. 2; area, 2 acres. Top-dressed with lime, 1 ton per acre, November, 1910. Stocked with one steer and two wether sheep, all about eighteen months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Steer ..	19/4/11	10/5/12	Removed to "healthy" country. Sold, fully recovered, in March, 1913.
Sheep No. 1 ..	8/1/11	25/9/11	Died of bush sickness, 18/10/11.
Sheep No. 2 ..	8/1/11	25/9/11	Died of bush sickness, 1/11/11.

Paddock No. 3; area, 2 acres. Top-dressed with sulphate of iron, 5 cwt. per acre, November, 1910. Stocked with one steer and two wether sheep, all about eighteen months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Steer ..	19/4/11	..	Still healthy and growing well at March, 1913, when sold to butcher.
Wether No. 1	25/2/11	..	Found dead 19/12/11, four days after shearing. Carcase was in good condition, and death was not due to bush sickness.
Wether No. 2	25/2/11	1/12/12	Lived until January, 1913, and then died of bush sickness.

Paddock No. 5; area, approximately 100 acres, much of it in standing bush. Utilized to accommodate control animals. No top-dressing. Stocked with four steers about fifteen months old, four ewes and four wethers about fifteen months old, and three lambs.

Sheep.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Steer No. 1 ..	8/1/11	..	Found dead. Possibly accident.
Steer No. 2 ..	8/1/11	..	Developed bush sickness, end of December, 1912. Removed to experimental farm, and there improved, and was sold.
Steer No. 3 ..	8/1/11	..	Still healthy in March, 1913, when sold to butcher.
Steer No. 4 ..	8/1/11	15/9/12	Removed when very noticeably affected, 16/11/12. Died, 31/3/13.
Ewe No. 1 ..	16/10/10	18/7/11	As had developed into a good case of bush sickness, was killed (5/9/11) in order to secure post-mortem specimens.
Ewe No. 2 ..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.
Ewe No. 3 ..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.
Ewe No. 4 ..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.
Wether No. 1	16/10/10	..	Found dead, 15/6/11. Doubtful whether bush sickness cause of death.
Wether No. 2..	16/10/10	..	Found dead, 2/5/12. Cause of death not bush sickness.
Wether No. 3..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.
Wether No. 4..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.
Lamb No. 1 ..	16/10/10	25/2/11	Killed, 6/3/11, when well affected with bush sickness.
Lamb No. 2 ..	16/10/10	23/4/11	Despatched to Wellington for experimental purposes, 30/4/11; affected then with bush sickness.
Lamb No. 3 ..	16/10/10	..	Remained healthy until killed by dogs about 10/11/12.

SERIES NO. 4, AT LICHFIELD.

Open undulating country at lower level. Is considered "healthy" for cattle, but not for sheep, especially lambs. All four of the paddocks used were first ploughed and sown down with English grasses and

clover. The control paddock had been in grass for several years, and was not ploughed.

Paddock No. 1; area, 2 acres. Top-dressed with 3 tons of carbonate of lime and $2\frac{1}{2}$ cwt. superphosphates per acre, January, 1912. Stocked with three pregnant ewes about one year and nine months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Ewe No. 1 ..	19/6/11	11/4/12	Removed, 10/6/12; then noticeably suffering from bush sickness.
Ewe No. 2 ..	19/6/11	1/6/12	Removed, 10/6/12; then slightly affected with bush sickness.
Ewe No. 3 ..	19/6/11	..	Removed, 10/6/12; then healthy.
Lamb No. 1 ..	Date birth, about 5/8/11	11/12/11	Died of bush sickness, 25/1/12.
Lamb No. 2 ..	Date birth, about 5/8/11	3/2/12	Killed, 17/3/12; then badly affected with bush sickness.
Lamb No. 3 ..	Date birth, about 5/8/11	22/2/12	Died of bush sickness, 30/3/12.

Paddock No. 2; area, 2 acres. Top-dressed with 5 cwt. salt and $2\frac{1}{2}$ cwt. superphosphate per acre, January, 1911. Stocked with one barren and two pregnant ewes about one year and nine months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Ewe No. 1 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 2 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 3 ..	19/6/11	..	Removed, 10/6/12, healthy.
Lamb No. 1 ..	Date birth, about 5/8/11	22/2/12	Died of bush sickness, 17/4/12.
Lamb No. 2 ..	Date birth, about 5/8/11	5/3/12	Killed when badly affected with bush sickness, 17/3/12.

Paddock No. 3; area, 2 acres. Top-dressed with sulphate of iron, 5 cwt. per acre, January, 1911. Stocked with three pregnant ewes about one year and nine months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Ewe No. 1 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 2 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 3 ..	19/6/11	..	Removed, 10/6/12, healthy.
Lamb No. 1 ..	Date birth, about 15/8/11	5/3/12	Found dead, 15/4/12; probably died from bush sickness.
Lamb No. 2 ..	Date birth, about 15/8/11	..	Died, 20/11/12, after shearing. Cause of death, bush sickness, accelerated by exposure after wool removed.
Lamb No. 3 ..	Date birth, about 15/8/11	..	Died, 28/11/12. Carcase in very fair condition. Doubtful whether affected by bush sickness.

Paddock No. 4; area, 3 acres. Top-dressed with basic slag, 10 cwt. per acre, January, 1911. Stocked with one barren and three pregnant ewes about one year and nine months old.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Ewe No. 1 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 2 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 3 ..	19/6/11	..	Removed, 10/6/12, healthy.
Ewe No. 4 ..	19/6/11	..	Removed, 10/6/12, healthy.
Lamb No. 1 ..	Date birth, about 15/8/11	11/1/12	Died of bush sickness, 28/1/12.
Lamb No. 2 ..	Date birth, about 15/8/11	13/2/12	Killed when in extremis, badly affected with bush sickness, 25/3/12.
Lamb No. 3 ..	Date birth, about 15/8/11	..	Still alive and well, 20/12/12. Later developed bush sickness, was removed to healthy country, and recovered.

Paddock No. 5; area, about 30 acres. Used as control. No top-dressing. Stocked with one barren and four pregnant ewes about one year and nine months old (one of which gave birth to twin lambs), and three hoggets.

Animal.	Date when placed in Paddock.	Appearance of First Noticeable Symptoms.	Result.
Ewe No. 1 ..	19/6/11	11/12/11	Died of bush sickness, 14/1/12.
Ewe No. 2 ..	19/6/11	30/4/12	Died of bush sickness, 15/6/12.
Ewe No. 3 ..	19/6/11	10/6/12	Removed, 10/6/12; then showing symptoms of bush sickness.
Ewe No. 4 ..	19/6/11	10/6/12	Removed, 10/6/12; then showing symptoms of bush sickness.
Ewe No. 5 ..	19/6/11	10/6/12	Removed, 10/6/12; then showing symptoms of bush sickness.
Hogget No. 1..	8/10/10	28/8/11	Exhibited well-marked symptoms of bush sickness, 5/9/11, and then sent to Wellington for experimental purposes.
Hogget No. 2..	8/10/10	28/10/11	Exhibited well-marked symptoms of bush sickness, 5/9/11, and then sent to Wellington for experimental purposes.
Hogget No. 3..	8/10/10	28/11/11	Died of bush sickness, 18/12/11.
Lamb No. 1 ..	Date birth	28/11/11	Died of bush sickness, 17/12/11.
Lamb No. 2 ..	Date birth	11/12/11	Died of bush sickness, 7/1/11.
Lamb No. 3 ..	Date birth	11/12/11	Died of bush sickness, 24/1/12.
Lamb No. 4 ..	Date birth	19/1/12	Died of bush sickness, 22/2/12.
Lamb No. 5 ..	Date birth	22/2/12	Died of bush sickness, 25/3/12.

It should be noted that in the experiments carried out at Te Pu and at Mamaku the animals were kept supplied with rock salt practically throughout the whole time, while at Lichfield rock salt was not used. It was most unfortunate that so many sheep were killed by dogs, no fewer than six of the control sheep at Mamaku being lost on one night. These control animals were being watched with great interest, as they had kept in good health for a much longer period

than had been anticipated, and their untimely death prevented the attainment of what would very probably have proved most useful information. They were running over a large area (100 acres), much of it in standing bush, and it would appear that they had been able to select feeding-areas where the herbage contained all the food constituents necessary for the maintenance of health and vigour. This is especially interesting in view of the fact that the district is one which is recognized as being affected much more than the Lichfield district. Yet in the Lichfield experiments every one of the control sheep developed bush sickness, and their lambs died several months before those on the dressed paddocks. Another interesting point is that in series No. 1 the sheep on the lime-treated paddock, even before exhibiting definite symptoms of sickness, did not thrive so well as did those on



B. C. Aston, photo.

THE LEAN STEERS ON RIGHT ARE FROM CONTROL Paddock (SERIES No. 3), MAMAKU.

the other paddocks, including the controls. In series Nos. 1 and 3 the moist climate and the conditions of the land (partially cleared bush land) was not such that a farmer would term "good sheep-country," and, quite apart from the question of bush sickness, the land is far better fitted for grazing cattle, the existing natural conditions in themselves constituting a handicap to the maintenance of sound health in sheep.

A study of these experiments, including those detailed in the April issue of the *Journal*, indicates that the best results were obtained, in the case of cattle, with soil-dressings of (1) superphosphate, (2) sulphate of iron, (3) blood and bones (with luxuriant herbage ploughed in), (4) guano (with luxuriant herbage ploughed in); in the case of sheep, with (1) sulphate of iron, (2) basic slag, (3) superphosphate.

With cattle the most striking results were obtained with superphosphate, these being emphasized by the comparison furnished by the

control steers (see April issue). The steer in the iron paddock in No. 3 series also furnished an example of the value of the top-dressing applied, his growth, development, and good condition being well marked

Those steers on the control paddock which kept healthy longest acquired the habit of disappearing into the bush for months at a time, then probably feeding on the bush rather than on pasture. N.B.—Wild cattle running in the bush are popularly supposed not to suffer from bush sickness.

It will be noted that with sheep the best results were obtained from those depastured upon paddocks top-dressed with iron sulphate (paddock No. 3, series No. 4). In this case the ewes kept in excellent condition throughout, and reared their lambs successfully, with one exception,



B. C. Aston, photo.]

BUSH-SICK LAMBS.

and that lamb had reached good marketable condition, and could have been profitably sold, before any indication of bush sickness was manifested by it. Further, on the other two experiments in series 4, where no iron dressing was used, all the lambs died; and in the adjacent control paddock not only did all the lambs die, but also all the three hoggets and two of the five ewes on it. In the case of the other iron-sulphate experiments with sheep it was unfortunate that one of the two animals used died through accident. The other, however, maintained excellent health and condition for a long period, ultimately dying of bush sickness in January, 1913.

Regarding the basic-slag sheep experiments, the most noticeable feature was the manner in which up to a certain point the sheep thrived. The soil-dressing had the effect of producing a luxuriant growth of herbage (see photo, *Journal*, July, 1912, Vol. v, p. 26), especially of clover, and the animals put on flesh and really fattened.

Too much rich feed, with its concomitant lack of necessity for exercise, is not good for the prolonged maintenance of health and vigour in sheep, fatty infiltration of the liver usually resulting; and this may have been a contributing factor in the less successful result of the basic-slag experiment. As it was, it gave better results with sheep than did the other top-dressing experiments (except the iron sulphate) in series 1 and 4.

The good results obtained with sheep from sulphate of iron used as top-dressing were rather seriously discounted by a later experiment conducted at Te Pu, where ewes, placed some time before lambing in paddocks top-dressed with this, died a few months later, together with their lambs; a further similar experiment at Lichfield also proving far less successful than did the first. There can, however, be no doubt, when the results on the control paddock are compared with those on the dressed plots, that the fertilizers exercised a very favourable effect on the health of the animals.

One point must be noted in connection with these later sheep experiments—viz., that the ewes utilized for them were designedly obtained from just over the reputed border of the affected country, where sheep can certainly be successfully kept, but probably have, so to speak, no reserve to draw upon when taken on to bush-sick land.

To sum up, we have had excellent results with cattle, but still have to determine whether, and by what means, sheep can be kept and lambs reared successfully. The Mamaku farm is now stocked with sixty two-year-old in-calf heifers, thirty yearling steers, and twenty-five in-lamb ewes. We look for good results with the cattle, and are hopeful regarding the sheep, though realizing that they present far greater difficulties.

In the swede manurial experiments at Ruakura Farm of Instruction the bones-and-superphosphate mixture has given the highest yield (40 tons to the acre), the no-manure plot yielding only $2\frac{1}{2}$ tons. The blood-and-bone mixture gave the lowest yield.

The town does not need the retired farmer, while the farm does need his experience and his capital. A retired farmer is capital going to waste.—*Scientific American*.

THE successful farmer does not leave everything to chance. He provides in ample time against weather-adversity and crop-failure, and he is coming to appreciate the fact that one of the best means to this end is silage.

FRUITGROWING IN THE WAIKATO.

LESSONS FROM RUAKURA.

A. W. GREEN.

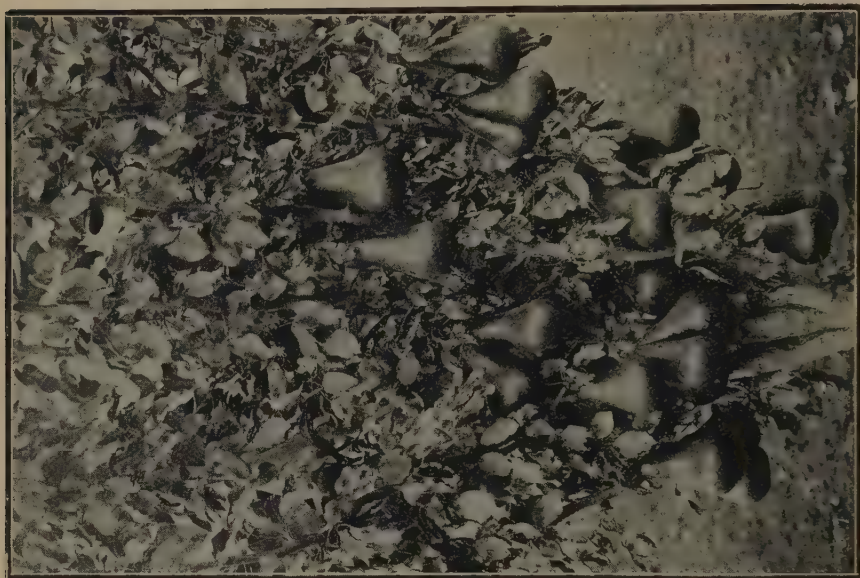
THE Waikato district is eminently adapted for the cultivation of fruits of the Temperate Zone. In the earlier days of settlement commercial fruitgrowing was carried on in this part of the Dominion by quite a large number of orchardists, but of late years dairying has largely displaced the industry. There was therefore no necessity to demonstrate at Ruakura Farm of Instruction that fruit could be grown in the Waikato. An experimental orchard was, however, established in order to discover and demonstrate the varieties of different classes of fruits most suitable for the locality, to illustrate the most satisfactory methods of pruning, and to test the value of different spraying and other compounds for the control of disease.

In reporting on the orchard at the present time it must be remembered that the trees are yet young. Some have been six years planted, others but five years, while the remainder were subsequently added by annual plantings. The selected area at the first planting presented an exceedingly rough appearance, being undrained poor kahikatea swamp. Consequently it could not be expected that the trees would make much headway for a time, and experience has shown that progress is slow for the first two years under such conditions.

Success, however, with some varieties on this class of land is each season becoming further assured. On the other hand, with the vast number of varieties under test, it can be seen that some will prove unsuitable for this locality. They will not flourish in this environment with the same degree of success met with in other soils and situations.

To any one desiring to plant in this district, an inspection of the orchard would be amply repaid. It is most instructive to observe and compare how well one variety thrives while another alongside it can barely exist.

With the exception of a block laid out for spraying experiments, the number of trees of each variety is limited to two. In order to conduct trials with various spraying-compounds it was considered necessary to plant a block with a few well-known varieties, and a sufficient number



GROSSE CALIBASSE PEAR.
Five-year-old tree, 6 ft. high; 53 lb. of fruit.



HARRINGTON'S VICTORIA PEAR.
Four-year-old tree, 4 ft. 6 in. high; 20 lb. of fruit; fine late-keeping variety; bears early.



BEURRE DE CAPIAUMONT PEAR.
Five-year-old tree, 6 ft. high; 42 lb. of fruit.



DIRECTEUR HARDY PEAR.
Seven-year-old tree, 8 ft. high; 114 lb. of fruit.

of each to provide the means for properly conducting the desired experiments. In all such trials it is essential that trees of the same variety should be included in each test, as a basis for comparison. The opposite occurs with variety trials, and with these one spray is used throughout. It is the pruning which is difficult to regulate in variety tests. The amount and style of pruning unavoidably varies, according to the vigour of the tree and the habit of growth characteristic of the variety. Nevertheless, the same system is followed as much as possible. The amount of cultivation and the manure to be applied can easily be regulated.

In regard to spraying, this season's results have contributed something to past records, especially in regard to the control of codlin-moth and scab. It is generally recognized in spraying that the treatment necessary to counteract the disease must be applied before the disease presents itself, the spray acting as a preventive measure rather than as a cure. Too much stress, therefore, cannot be laid on the importance of winter sprayings. It has proved profitable to apply two winter sprayings of Bordeaux mixture at a strength of 10-10-40 for the control of apple and pear scab (*Fusicladium dendriticum*). This materially reduces the number of summer sprayings necessary to hold the disease in check. With some varieties no summer applications have been considered needful. Directeur Hardy, Harrington's Victoria, and P. Barry pears, and Duke of Clarence, Aromatic Russet, Brownlee's Russet, Wealthy, Lord Derby, and Cole's Rymer apples, all gave clean fruit without any application of the summer formula. Summer sprayings were found indispensable for the following varieties of pears: Beurre Diel, Vicar of Winkfield, Marie Louise, D'Uccles, and Williams's Bon Chrétien; and for the following varieties of apples: Adam's Permain, Sharp's Midseason, Romanite, Red Quarrenden, Tairaru Seedling, Betty Geeson, and Rhodes Orange.

With peaches it has also been proved that for the die-back fungus (*Clasterosporium carpophilum*) two sprayings are to be preferred, the first to be applied as soon as possible after the leaves have fallen and the second just before the blossom-buds open, using the Bordeaux mixture at a strength of 10-10-40. Little good can be done by spraying after the disease has made its appearance, therefore spray before the disease appears. This same rule must be remembered when applying arsenate of lead for codlin-moth (*Carpocapsa pomonella*). Get in early or the moth will win. To combat mussel scale (*Mytilaspis pomorum*), woolly aphis (*Schizoneura lanigera*), and red spider (*Bryobia pratensis*), a winter spraying of red oil, or lime-salt and sulphur, is all-important. Miss this spray and these pests will give endless trouble during the summer. C. D. Jarvis, in his bulletin on apple-growing, sums up the



PRINCE ALFRED APPLE.

Natural size ; picked from five-year-old tree, bearing 40 lb. of fruit. The apple pictured weighs 22 oz.

whole problem explicitly and correctly in these few words: "Know the pest; know what to use; know when to use it; apply it thoroughly."

To illustrate the results obtained at Ruakura a few photos are herewith reproduced.

Some varieties which prove suitable for planting in this locality are here tabulated. There are other promising varieties not included in this list, but the trees are young, and it will take some time to prove their suitability:—

Peaches: Brigg's Red May, Wiggins, Early Newington, Ruby Red, Hales' Early, Triumph, and Reeves' Golden Nugget.

Nectarines: Goldmine and Ansenne.

Apples: Scarlet Permain, Golden Pippin, Irish Peach, Duchess of Oldenburg, Prince Alfred, Willie Sharp, Early Almond, New Rock Pippin, Brownlee's Russet, and Jonathan.

Pears: Directeur Hardy, Beurre de Capiaumont, Howell, Kieffer Hybrid, Williams's Bon Chrétien, Grosse Calibasse, and Harrington's Victoria.

PUBLIC DEMONSTRATIONS IN APPLE GRADING, PACKING, ETC.

DURING the months of March and April public demonstrations in apple packing and grading, pruning and spraying, general fruit-culture, and tomato-culture were given at the following places by the Orchard Instructors:—

Wade, Birkdale, Albany: N. R. Pierce.

Silverdale, Birkdale, Albany: W. C. Thompson.

Levin, Palmerston North, Feilding, Wanganui, Urenui, Rata, Greytown: G. Stratford.

Lower Hutt: T. C. Webb, jun.

Pangatotara, Ngatimoti, Lower Moutere, Richmond: J. H. Thorp.

Blenheim: B. G. Goodwin.

Totara Flat, Reefton: W. J. Courtier.

Adair, Hunter, Willowbridge, Morven, Waimate, Oamaru: A. B. Mansfield.

In the horticultural section at the Ruakura Farm of Instruction a fruit-house has been provided, to test the keeping-qualities of different varieties of apples and pears, and to serve as a showroom where the fruit can be labelled and properly displayed for the benefit of visiting fruitgrowers.

CHEESE.

EXAMINATIONS FOR CONTENT OF MOISTURE AND FAT.

W. E. GWILLIM.

THE particulars given here are the results of cheese examined for content of moisture and fat from the 9th January to the 20th March of this year, and is a continuation of the work described in the first article on this subject, which appeared in the January and February numbers of this *Journal*.

The examinations were conducted on similar lines. Samples of cheese of all grades of quality were examined, and the age of each cheese was noted, the value of the body and texture being scored in points.

Appended to list A (Part II) is a summary of the average percentages of each factory brand for the periods from the 17th October to the 27th December, and from the 9th January to the 20th March, and also a summary of the average percentages of the brands as shipped by each fortnightly steamer.

A comparison of both parts of each list, of the percentage of cheese having a moisture-content between 35 and 38 per cent. and fat-content between 32 and 35 per cent., is as follows:—

—	Highest Percentage.	Lowest Percentage.	Average Percentage.	Percentage of Samples.
List A: Moisture—				
Part I	38.2	35.0	36.85	95
Part II	38.6	32.8	35.46	56
List A: Fat—				
Part I	36.8	31.2	33.64	75
Part II	36.8	29.6	34.41	47
List B: Moisture—				
Part I	38.8	33.4	36.25	83
Part II	37.4	33.2	35.34	61
List B: Fat—				
Part I	36.8	30.4	33.78	81
Part II	37.6	31.2	34.15	56
List C: Moisture—				
Part I	39.5	32.3	36.06	66
Part II	36.0	34.4	35.23	50
List C: Fat—				
Part I	36.8	30.8	33.73	75
Part II	37.2	34.0	35.40	12

The cheeses in list C are of indifferent make. In the first part 27 per cent. and in the second part 62 per cent. were second grade, on account of defects in body and texture. It is apparent from these

examinations that this class of cheese has nothing to commend its manufacture.

This work will conclude with the close of the export season, and a final report will appear in due course.

LIST A, PART II.

Particulars of fifty-nine samples of cheese examined for content of moisture and fat, ex lots from ten factories in the Wairarapa and Forty-mile Bush districts, exported by the six fortnightly steamers "Ruapehu," "Athenic," "Turakina," "Corinthic," "Remuera," and "Arawa," which sailed 9th January to 20th March, 1913, inclusive. One sample from each brand each fortnight. Body and texture about normal for acid. Maximum grading score obtainable for body and texture, 30 points.

Number for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age, and Notes at Sampling.		
				Days old.	Body and Texture.	
					Points.	Remarks.
1	Per Cent.	Per Cent.	Per Cent.	27	28½	..
	34.6	33.6	31.8	12	28	..
	35.4	32.4	32.2	12	28	On green side.
	36.3	34.8	28.9	9	28	"
	36.4	34.8	28.8	18	28	Little acidy.
	35.8	36.0	28.2	15	28	On green side.
Average ..	35.60	34.60	29.80	15.6	28.1	
2	38.6	32.0	29.4	20	28	Little weak and open.
	35.6	34.4	30.0	21	28	Little weak.
	35.5	34.4	30.1	22	28½	..
	35.3	34.8	29.9	25	28	..
	35.0	36.8	28.2	19	28½	Tender enough.
	36.2	35.6	28.2	22	28½	..
Average ..	36.03	34.67	29.30	21.5	28.3	
3	35.0	33.6	31.4	24	29	..
	35.8	31.6	32.6	25	29	..
	35.3	34.4	30.3	20	28	..
	34.6	35.2	30.2	27	29	..
	35.2	35.2	29.6	22	29	..
	35.4	36.0	28.6	16	29	..
Average ..	35.22	34.33	30.45	22.3	28.8	
4	35.2	33.2	31.6	17	28½	On green side.
	34.0	33.6	32.4	21	29	..
	33.7	35.6	30.7	18	28½	..
	32.8	35.6	31.6	15	28½	..
	34.6	36.4	29.0	15	29½	Good.
	34.4	36.4	29.2	25	29	..
Average ..	34.12	35.13	30.75	19.5	28.8	

Number for Factory Brand.	Age, and Notes at Sampling.				Body and Texture.	
	Moisture.	Fat.	Casein and other Solids.	Days old.	Points.	Remarks.
5	Per Cent.	Per Cent.	Per Cent.			
	38.4	32.0	29.6	14	28	On green side.
	37.0	29.6	33.4	14	28	"
	38.0	32.8	29.2	20	28	Little weak.
	36.3	34.5	29.2	20	28	"
	36.0	34.4	29.6	14	28	On green side.
	36.8	32.0	31.2	14	28	"
Average ..	37.08	32.55	30.37	16	28	
6	35.0	32.8	32.2	19	28½	..
	35.4	32.8	31.8	19	28½	..
	37.2	33.6	29.2	31	28	..
	35.7	33.2	31.2	17	28	Little acidy.
	35.4	35.6	29.0	18	29	..
	36.0	34.4	29.6	29	29	..
Average ..	35.78	33.73	30.49	22.2	28.5	
7	38.6	31.2	30.2	24	29½	Good.
	36.4	31.2	32.4	25	28½	..
	34.6	35.6	29.8	21	28½	..
	34.5	35.6	29.9	30	28½	..
	35.4	33.6	31.0	25	28½	..
	36.0	35.2	28.8	16	29	..
Average ..	35.92	33.73	30.35	23.5	28.7	
8	35.6	34.2	30.2	34	28½	..
	36.0	34.4	29.6	33	28	..
	..	..	..	..	..	(None shipped.)
	35.3	34.8	29.9	18	28	..
	34.8	36.0	29.2	22	28½	..
	36.0	36.0	28.0	21	28	..
Average ..	35.54	35.08	29.38	25.6	28.2	
9	35.8	33.6	30.6	25	29½	Good.
	36.2	34.4	29.4	28	28½	..
	33.9	36.0	30.1	28	28½	Tender enough.
	34.2	35.6	30.2	28	29	..
	34.8	36.4	28.8	23	28½	Tender enough.
	34.2	36.8	29.0	24	29	..
Average ..	34.85	35.47	29.68	26	28.8	
10	34.8	33.6	31.6	24	28½	..
	34.6	32.8	32.6	20	28	..
	34.4	34.4	31.2	20	28½	Tender enough.
	34.2	36.0	29.8	31	29	..
	34.2	35.6	30.2	24	28½	..
	34.8	36.4	28.8	21	28½	Tender enough.
Average ..	34.50	34.80	30.70	26.3	28.5	

*Summary of the Average Percentages from 9th January to 20th March,
1913.*

Number for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age, and Notes at Sampling.			
				Days old.	Body and Texture.		Remarks.
					Points.		
1	35.60	34.60	29.80	15.6	28.1		..
2	36.03	34.67	29.30	21.5	28.3		..
3	35.52	34.33	30.45	22.3	28.8		..
4	34.12	35.13	30.75	19.5	28.8		..
5	37.08	32.55	30.37	16.0	28.0		..
6	35.78	33.73	30.49	22.2	28.5		..
7	35.92	33.73	30.35	23.5	28.7		..
8	35.54	35.08	29.38	25.6	28.2		..
9	34.85	35.47	29.68	26.0	28.8		..
10	34.50	34.80	30.70	23.3	28.5		..
Average ..	35.47	34.40	30.13	21.5	28.5		..

*Summary of the Average Percentages in First Part of this List from
17th October to 24th December, 1912.*

Number for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Age, and Notes at Sampling.			
				Days old.	Body and Texture.		Remarks.
					Points.		
1	37.17	32.67	30.16	..	..		..
2	37.43	33.40	29.17	..	..		..
3	36.98	33.80	29.22	..	..		..
4	36.08	33.80	30.12	..	..		..
5	37.41	33.20	29.39	..	..		..
6	36.75	33.40	29.85	..	..		..
7	36.87	34.33	28.80	..	..		..
8	36.48	33.93	29.59	..	..		..
9	37.03	33.40	29.37	..	..		..
10	36.25	34.53	29.22	..	..		..
Average ..	36.85	33.64	29.51	..	..		..
General ave- rage	36.16	34.02	29.82				..

Summary of Average Percentages of the Ten Brands shipped by each Fortnightly Steamer.

Steamer.	Moisture.	Fat.	Casein and other Solids.	Days old.	Points.	Sailing-date.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	
Arawa	35.49	35.48	29.03	20.3	28.6	1913. March 20.
Remuera	35.12	35.60	29.28	20.0	28.6	" 6.
Corinthic	34.93	35.01	30.06	22.0	28.4	February 20.
Turakina	35.43	34.62	29.95	21.3	28.3	" 7.
Athenic	35.66	32.70	31.64	21.8	..	January 24.
Ruapehu	36.16	32.98	30.86	22.8	..	" 9.
Average (second six shipments)	35.47	34.40	30.13	21.5	28.5	
Ionic	36.88	33.44	29.68	20.0	..	1912. December 27.
Rotorua	36.85	32.72	30.43	21.5	..	" 12.
Tainui	36.90	33.08	30.02	..	..	November 28.
Ruahine	36.93	33.60	29.47	..	..	" 14.
Arawa	36.46	34.40	29.14	..	..	" 1.
Remuera	37.06	34.64	29.30	..	..	October 17.
Average (first six shipments)	36.85	33.64	29.51	..	..	
General average ..	36.16	34.02	29.82	..	..	

LIST B, PART II.

Particulars of thirty-six samples of cheese examined for content of moisture and fat, ex lots of thirty-one factories graded at grading-ports as stated and shipped by various Home-going steamers which sailed from the 9th January to the 20th March, 1913, inclusive. Body and texture about normal for acid. Maximum grading score obtainable for body and texture, 30 points.

Tested to	Graded at	No. for Brand.	Moisture.	Fat.	Casein and other Solids.	Age, and Notes at Sampling.		
						Days old.	Body and Texture.	
							Points.	Remarks.
			Per Cent.	Per Cent.	Per Cent.			
9/1/13	Wellington ..	99	34.6	33.6	31.8	27	28½	
24/1/13	" ..	103	35.8	32.0	32.2	21	29	
	" ..	4	33.6	36.0	30.4	18	29	
	Patea ..	70	36.6	33.2	30.2	35	28	
	" ..	104	36.8	32.0	31.2	34	28	
	New Plymouth	105	36.8	33.2	30.0	25	28	
	" ..	84	34.6	34.8	30.6	18	29	
	" ..	83	37.4	32.0	30.6	27	28	Little weak.
	" ..	106	34.6	32.8	32.6	28	28	
	" ..	87	35.0	32.8	32.2	30	28	
	" ..	107	36.0	32.8	31.2	30	28½	
	" ..	102	35.2	32.4	32.4	21	28	

Tested to	Graded at	No. for Brand.	Moisture.	Fat.	Casein and other Solids.	Age, and Notes at Sampling.	
						Days old.	Body and Texture.
							Points. Remarks.
			Per Cent.	Per Cent.	Per Cent.		
	New Plymouth	108	36.0	31.2	32.8	30	28 Little acidy.
	"	109	35.4	33.2	31.4	27	29
	Lyttelton ..	110	35.2	32.8	32.0	34	28 Firm enough.
	" ..	111	34.8	32.8	32.4	30	28
	" ..	112	34.0	34.0	32.0	25	28½
	" ..	113	36.0	32.0	32.0	30	28 Firm enough.
7/2/13	Wellington ..	103	35.6	35.6	28.8	28	29
	" ..	15	36.0	34.8	29.2	20	28½ Firm enough.
	" ..	99	34.6	34.8	30.6	28	28½
	" ..	52	33.4	36.0	30.6	33	29
	" ..	114	34.4	36.0	29.6	18	28 Little acidy.
	" ..	115	35.6	36.0	28.4	24	28 Tender enough.
	Patea ..	116	35.8	34.0	30.2	35	28 Could be firmer.
	" ..	117	33.4	37.2	29.4	26	28 Firm side; salty.
	" ..	59	36.4	34.4	29.2	24	29
6/3/13	Wellington ..	118	35.2	36.0	28.8	16	28
	" ..	119	34.5	34.4	31.1	25	29
	" ..	4	33.2	37.6	29.2	23	29
	" ..	55	36.4	35.2	28.4	31	28½
	" ..	50	34.6	36.4	29.0	15	29½ Good.
	" ..	65	35.6	35.6	28.8	20	28½
	" ..	2	35.8	35.2	29.0	16	28 Little weak.
	New-Plymouth	107	36.6	33.2	30.2	20	28
	"	102	36.8	33.2	30.0	24	28½
	Average ..	..	35.34	34.15	30.51	25.4	28.4

Summary of Averages.

Graded at	No. of Samples.	Moisture.	Fat.	Casein and other Solids.	Days old.	Points.
		Per Cent.	Per Cent.	Per Cent.		
Wellington ..	16	34.93	35.33	29.74	22.7	28.6
Patea ..	5	35.80	34.16	30.04	30.8	28.2
New Plymouth ..	11	35.86	32.87	31.27	25.5	28.3
Lyttelton ..	4	35.00	32.90	32.10	29.7	28.1
Average ..	36	35.34	34.15	30.51	25.4	28.4

Percentages of 105 Samples given in First Part of this List: 17th October to 24th December, 1912.

	Moisture.	Fat.	Casein and other Solids.	Days old.	Points.
	Per Cent.	Per Cent.	Per Cent.		
Average of 105 samples ..	36.08	33.75	30.17	..	..
General average of 141 samples ..	35.89	33.85	30.26	..	..

LIST C, PART II.

Particulars of eight samples of cheese examined for content of moisture and fat, ex lots from seven factories graded at Wellington and shipped by various Home-going steamers which sailed from the 9th January to the 20th March, 1913, inclusive. Cheese scoring 27 points and over are first grade; below 27 points are second grade.

Tested to	Graded at	No. for Brand.	Moisture.	Fat.	Casein and other Solids.	Age; and Notes at Sampling.		
						Days old.	Body and Texture.	
							Points.	Remarks.
7/2/13	Wellington ..	120	Per Cent. 34.4	Per Cent. 35.2	Per Cent. 30.4	21	27½	Lacks silkiness.
	" ..	75	34.8	35.2	30.0	24	26½	Green; sweet holes.
	" ..	2	35.6	34.0	30.4	13	26½	Sweet holes.
	" ..	121	35.6	35.2	29.2	14	26	Dry; acid cut.
	" ..	1	34.6	35.2	30.2	18	27	Green; dry; salty.
6/3/13	" ..	122	36.0	36.0	28.0	21	27	Weak; acid.
	" ..	121	34.8	35.2	30.0	29	26	Acid; dry; salty.
20/3/13	" ..	89	36.0	37.2	26.8	21	26	Acid cut; soft.
	Average ..	..	35.23	35.40	29.37	20.1	26.6	

Percentages of Forty-one Samples given in First Part of this List: 17th October to 27th December, 1912.

					Moisture.	Fat.	Casein and other Solids.
					Per Cent.	Per Cent.	Per Cent.
Average ..	..	..	..	..	36.06	33.73	30.21
General average of 49 samples					35.92	34.0	30.08

SUMMARY OF PERCENTAGES: LIST A, PART II.

Moisture-content.

Highest.		Lowest.		Average.
38.6	..	32.8	..	35.46
Range.		No. of Samples.		Per Cent.
32.1 to 33.0	..	1	..	1.69
33.1 to 34.0	..	3	..	5.09
34.1 to 35.0	..	19	..	32.20
35.1 to 36.0	..	23	..	38.98
36.1 to 37.0	..	8	..	13.56
37.1 to 38.0	..	2	..	3.39
Over 38.0	..	3	..	5.09
		59		100.00

Fat-content.

Highest.	Lowest.	Average.
36.8	29.6	34.41
Range.	No. of Samples.	Per Cent.
29.1 to 30.0	1	1.69
30.1 to 31.0	..	..
31.1 to 32.0	6	10.17
32.1 to 33.0	5	8.47
33.1 to 34.0	10	16.95
34.1 to 35.0	13	22.03
35.1 to 36.0	18	30.52
Over 36.0	6	10.17
	59	100.00

SUMMARY OF PERCENTAGES : LIST B, PART II.

Moisture-content.

Highest.	Lowest.	Average.
37.4	33.2	35.34
Range.	No. of Samples.	Per Cent.
33.1 to 34.0	5	13.89
34.1 to 35.0	9	25.00
35.1 to 36.0	14	38.89
36.1 to 37.0	7	19.44
Over 37.0	1	2.78
	36	100.00

Fat-content.

Highest.	Lowest.	Average.
37.6	31.2	34.15
Range.	No of Samples.	Per Cent.
31.1 to 32.0	4	11.11
32.1 to 33.0	6	16.66
33.1 to 34.0	8	22.23
34.1 to 35.0	6	16.66
35.1 to 36.0	9	25.00
36.1 to 37.0	1	2.78
Over 37.0	2	5.56
	36	100.00

SUMMARY OF PERCENTAGES : LIST C, PART II.

Moisture-content.

Highest.	Lowest.	Average.
36.0	34.4	35.23
Range.	No. of Samples.	Per Cent.
34.1 to 35.0	4	50.00
35.1 to 36.0	4	50.00
	8	100.00

Fat-content.

Highest.	Lowest.	Average.
37.2	34.0	35.40
Range.	No. of Samples.	Per Cent.
34.1 to 35.0	1	12.25
35.1 to 36.0	6	75.50
36.1 to 37.0	..	..
Over 37.0	1	12.25
	8	100.00

WATERS FOR DAIRY PURPOSES, ETC.

SOME ANALYSES.

B. C. ASTON.

RESULTS, IN PARTS PER 100,000.

Laboratory No.	Locality.	Odour on heating to 100° Fahr.	Chlorine in	Nitrogen in Nitrates.	Nitrogen in Nitrites.	Free Saline Ammonia.	Albumenoid Ammonia.	Total Solids.	Remarks.
C 223	Mataura River ..	Faint ..	1.090	Fairly large	Large	0.0100	0.048	23.96	A contaminated water.
261	Makarewa Freezing-works	None	3.763	Small ..	Fair quantity	0.0120	0.004	12.20	Permissible for use if no better water available.
363	Kumara (spring)	" ..	0.923	None ..	None ..	0.0008	0.003	4.94	A pure water, as far as chemical analysis can show.
505 (1)	Longburn ..	Slight ..	4.685	Small ..	Fair quantity	0.0160	0.054	27.34	Chars, with strong odour, on ignition. Unsuitable for watering stock if a better water is available.
505 (2)	" ..	" ..	3.550	" ..	" ..	0.0300	0.062	24.60	Ditto.
505 (3)	" ..	" ..	3.686	" ..	" ..	0.0260	0.054	19.80	"
557	Konini, Pahiatua	None ..	1.775	" ..	" ..	0.0300	0.004	10.76	Permissible for use in dairy factory.
646	Wairoa, Westland	" ..	0.530	None ..	None ..	0.0080	0.012	7.30	A good water, suitable for dairy purposes.

LIVE-STOCK.

STATEMENT SHOWING CONDITION OF LIVE-STOCK DURING THE PAST SEASON, 1ST APRIL, 1912, TO 31ST MARCH, 1913.

SHEEP.

Groups of Stock- inspection Districts.	Number of Sheep at 30th April, 1912.	Health and Condition.	Mortality Percentage.	Number of Breeding Dewes on Hand in- tended to be bred from.	Lambs born: Esti- mated Percentage.	Estimated Mortality Percentage among Lambs up to Weaning.	Estimated Number of Lambs reared.	Clip: Weight and Condition.	Condition of Flocks regarding Lice and Ticks.	Dipping: How performed.
<i>North Island.</i>										
No. 1—Otago, Waikato, Auckland, and Thames	533,701	Good ..	Adults, 5; hoggets, 10½	264,942	85	4	223,754	Not so heavy as last year, but condi- tion better, and sounder	Fairly satisfactory	Satisfactorily, except in Thames district.
No. 2—Hamilton, Te Kuiti, and Tauranga	927,453	Very good	Adults, 2½; hoggets, 5	494,833	92	6	427,933	Hamilton, heavy and good. Te Kuiti, much im- proved; Tauran- ga, not so good as usual	Fairly satisfactory	Hamilton and Te Kuiti, satisfac- torily; Tauranga, not satisfactorily.
No. 3—New Plymouth, Opunake, Stratford, and Hawera	468,853	Good ..	Adults, 3½; hoggets, 4½	247,237	90	5½	210,275	Weight heavier, ex- cept in Hawera. Condition better than usual all round	Satisfactory all round	Not satisfactorily in New Plymouth district; satisfac- torily in other dis- tricts.
No. 4—Wanganui, Feilding, and Palmerston North	2,970,763	Good ..	Adults, 3½; hoggets, 6	1,473,354	95	3	1,357,696	Weight lighter than last season. Con- dition good	Satisfactory, except in Feilding dis- trict	Fairly satisfactorily.
No. 5—Gisborne and Hastings	4,903,569	Good ..	Adults, 2½; hoggets, 6	2,441,360	85	1½	2,044,020	Good ..	Not satisfactory ..	Not satisfactorily.
No. 6—Woodville, Masterton, and Wellington	2,814,750	Good ..	Adults, 3½; hoggets, 4	1,471,744	92	3	1,313,354	Good ..	Fairly satisfactory in Woodville and Wellington, but prevalent in Mas- terton	Not satisfactorily in Woodville and Masterton; satis- factorily in Wel- lington.
Totals, North Island ..	12,618,089	..	..	6,393,490	..	..	5,577,062	..	..	..

South Island.

No. 1—Nelson and Blenheim	1, 197, 071	Good	Adults, 4½ hoggets, 7½	649, 214	71	13	401, 019	Good in Nelson; neither so heavy nor so good as usual in Blenheim	Fairly free from lice, but ticks very prevalent	Fairly satisfactorily.
No. 2—Hokitika	110, 562	Good	Adults, 3; hoggets, 5	51, 070	93	10	43, 664	Weight, heavy; condition, good	Very fair	Fairly satisfactorily.
No. 3—Amberley, Christchurch, and Sockburn	3, 538, 804	Good	Adults, 3; hoggets, 5½	1, 980, 884	93	7½, 2½†	1, 780, 981	Weight, average; condition, good	Satisfactory	Satisfactorily.
No. 4—Timaru and Oamaru	2, 148, 120	Good	Adults, 6; hoggets, 6½	1, 177, 046	97½	4	1, 101, 715	Light	Satisfactory	Satisfactorily.
No. 5—Dunedin, Mosgiel, and Balclutha	2, 092, 604	Good	Adults, 3; hoggets, 7½	1, 011, 268	82	3½	802, 280	Light, good condition	Satisfactory as to lice, ticks not	Fairly satisfactorily.
No. 6—Invercargill and Gore	1, 966, 298	Good	Adults, 4½; hoggets, 9	980, 634	77½	9	691, 592	Invercargill, heavy, but not in good condition; Gore, light, condition sound	Fairly satisfactory	Fairly satisfactorily.
Totals, South Island	11, 132, 064			5, 650, 116			4, 821, 260			
Totals, North Island	12, 618, 089			6, 393, 460			5, 577, 092			
Grand totals	23, 750, 153			12, 243, 576			10, 398, 322			

† Crossbred.

* Merino.

NORTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

No. 1 stock-inspection district comprises the Counties of Mongonui, Whangaroa, Hokianga, Bay of Islands, Whangarei, Hobson, Otamatea, Rodney, Waitemata, Eden, Manukau, Coromandel, and Thames.

No. 2 stock-inspection district comprises the Counties of Waikato, Raglan, Waipa, Ohinemuri, Piako, Matamata, East Taupo and Rotorua, Kawhia, Waitomo, Awakino, West Taupo and Ohura, Waimarino, Kaitieke, Tauranga, Whakaneke, and Opotiki.

No. 3 stock-inspection district comprises the Counties of Clifton, Taranaki, Egmont, Stratford, Whangamomona, Eltham, Waimate West, and Haveria.

No. 4 stock-inspection district comprises the Counties of Patea, Waitotara, Wanganui, Rangitikei, Kiwitea, Pohangina, Oroua, Manawatu, Kairanga, and Horowhenua.

No. 5 stock-inspection district comprises the Counties of Waipatu, Cook, Waikohu, Waioa, Hawke's Bay, Waipawa, Waipukurau, and Patangata.

No. 6 stock-inspection district comprises the Counties of Weber, Dannevirke, Woodville, Pahiatua, Akito, Eketahuna, Masterton, Mauriceville, Castlepoint, Wairarapa South, Featherston, Hutt, and Makara.

SOUTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

No. 1 stock-inspection district comprises the Counties of Collingwood, Takaka, Waimea, Sounds, Awatere, and Marlborough.

No. 2 stock-inspection district comprises the Counties of Buller, Inangahua, Murchison, Grey, and Westland.

No. 3 stock-inspection district comprises the Counties of Kaituma, Amuri, Cheviot, Waipara, Tawera, Ashley, Selwyn, Waimairi, Malvern, Paparua, Heathcote, Halswell Springs, Ellesmere, Mount Herbert, Akaroa, Wairewa, and Ashburton.

No. 4 stock-inspection district comprises the Counties of Geraldine, Levels, Mackenzie, Waimate, and Waitaki.

No. 5 stock-inspection district comprises the Counties of Waitema, Waikouaiti, Peninsula, Vincent, Maniototo, Tairā, Bruce, Clutha, and Invercargill.

No. 6 stock-inspection district comprises the Counties of Lake, Southland, Wallace, and Fiord, and Stewart Island.

STATEMENT SHOWING CONDITION OF LIVE-STOCK, ETC.—*continued.*

CATTLE.										
Groups of Stock-inspection Districts.	Number of Dairy Cows, April, 1911.	Number of Dairy Cows, April, 1911.	Estimated Percentage of Mortality among Dairy Cattle during Spring Months, due to all Causes.	Estimated Percentage of Calves Kept, and how fed.	Estimated Percentage of Mortality in Calves due mainly to Insufficient Feeding.	Estimated Number of Calves reared.	Estimated Percentage of Depreciation in Value of Calves due to Insufficient Feeding.	Provision for Winter Feed.	Condition of Cattle at end of Winter.	
North Island.										
No. 1—Ohaeawai, Whangarei, Auckland, and Thames	262,674	88,016	6	Ohaeawai, all kept; Whangarei and Auckland, 70 per cent.; Thames (4,500), whey and skim-milk	7	80,164	20	No special provision..	Ohaeawai, poor; Whangarei, fair; Auckland, good; Thames, poor.	
No. 2—Hamilton, Te Kuiti, and Tauranga	278,663	85,485	3	Hamilton and Tauranga, 85 per cent.; Te Kuiti (5,595), whey and skim-milk	25	57,049	70	Hay and a few turnips, but generally very little special provision	Tauranga, poor; Hamilton and Te Kuiti, good	
No. 3—New Plymouth, Opunake, Stratford, and Hawera	260,511	122,742	3	65 per cent.; fed on skim-milk and whey mixed with some kind of calf-food	6	68,700	25	Hay and root crops ..	Very fair except in Opunake district, where the condition is very poor.	
No. 4—Wanganui, Feilding, and Palmerston North	265,012	79,244	4	68 per cent.; skim-milk and whey chiefly, with calf-meat added in some cases	8½ in Wanganui and Palmerston, 5 in Feilding	44,067	34	Very little special provision	Wanganui, good; Palmerston, fair; Feilding, poor.	
No. 5—Gisborne and Hastings	289,318	24,611	2½	62 per cent.; skim-milk and calf-food	3½	14,350	15	Very little provision other than hay	Very good.	
No. 6—Woodville, Masterton, and Wellington	235,811	60,671	3	44 per cent.; factory by-products and some calf-food	10	22,835	25	Fair provision in Woodville district—hay and root crops; very little provision in Masterton and Wellington	Good in Woodville, medium in Masterton and Wellington.	
Totals, North Island ..	1,501,989	460,769	..	..	..	287,165	..	..	..	

South Island.

No. 1—Nelson and Blenheim	39,636	14,929	2	56 per cent.; skim-milk	7½	8,111	22½	A little provision in dairying districts, no provision elsewhere. Practically no provision; a little hay	Poor in Nelson, good in Blenheim.
No. 2—Hokitika ..	38,740	11,233	..	90 per cent.; whole and skim milk and other ingredients	7½	8,734	20		Medium.
No. 3—Amberley, Christchurch, and Sockburn	103,364	42,878	1½	53 per cent.; skim-milk and some patent food	2	18,793	30	Much neglected in Amberley district. Hay and root crops in other districts	Good.
No. 4—Timaru and Oamaru..	47,856	21,573	3	75 per cent.; skim-milk and artificial food	8	14,911	25	Very little special provision	Good.
No. 5—Dunedin, Mosgiel, and Balclutha	81,691	36,004	3½	41 per cent.; skim-milk, whey, and artificial food	4½	12,187	30	Fair	Fairly good.
No. 6—Invercargill and Gore	116,895	46,347	2	60 per cent.; skim-milk and artificial food	3½	25,878	30	Good	Good.
Totals, South Island ..	428,182	172,964	..	..	..	88,619	..	..	..
Totals, North Island ..	1,591,989	460,769	..	..	..	287,165	..	..	..
Grand totals ..	2,020,171	633,733	..	..	..	375,784	..	..	..

NORTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

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No. 3 stock-inspection district comprises the Counties of Clifton, Taranaki, Egmont, Stratford, Whangamonua, Eitham, Waimate West, and Hawera.

No. 4 stock-inspection district comprises the Counties of Patoka, Waikotara, Waunganui, Rangitikei, Kivitea, Pohangina, Oroua, Manawatu, Kairanga, and Horowhenua.

No. 5 stock-inspection district comprises the Counties of Waipatu, Cook, Waikohu, Waeroa, Hawke's Bay, Waipawa, Waipukurau, and Patangata.

No. 6 stock-inspection district comprises the Counties of Weber, Dannevirke, Woodville, Pahiatua, Akito, Eketahuna, Masterton, Mauriceville, Castlepoint, Waerapa South, Featherston, Hutt, and Makara.

SOUTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

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No. 4 stock-inspection district comprises the Counties of Geraldine, Levels, Mackenzie, Waimate, and Waitaki.

No. 5 stock-inspection district comprises the Counties of Waheho, Waikouaiti, Peninsula, Vincent, Maniototo, Taleri, Bruce, Clutha, and Tuapeka.

No. 6 stock-inspection district comprises the Counties of Lake, Southland, Wallace, and Fiord, and Stewart Island.

South Island

No. 1—Nelson and Blenheim	14, 198	Very good	Not progressive	..	12, 675	Good ..	Fairly progressive	Grains and root crops	Allowed to run in small paddocks and yards	Yes.
No. 2—Hokitika ..	6, 185	Good	Not progressive	..	4, 987	Very fair	Progressing slowly	Skim-milk and root crops	Roam ..	Yes in most cases.
No. 3—Amberley, Christchurch, and Sockburn	53, 144	Good	Draughts, progressive; light, not progressive	..	54, 254	Good ..	Progressive ..	Skim-milk, root crops, and grass	Roam ..	Yes.
No. 4—Timaru and Oamaru	31, 327	Good	Draughts, progressive; light, not progressive	..	22, 006	Good ..	Not progressive	Mostly skim-milk, a little root crops in some cases	Mostly housed..	Not much.
No. 5—Dunedin, Mosgiel, and Balclutha	34, 520	Good	Progressive	..	18, 991	Good ..	Progressive ..	City offall, skim-milk, and root crops	Allowed to roam until taken in to fatten	Yes.
No. 6—Invercargill and Gore	34, 118	Good	Progressive	..	18, 368	Good ..	Not very progressive	Whey, offall, potatoes, and grain	Mostly housed..	Yes.
Totals, South Island	173, 492	..	..	..	131, 281	..	..	..	..	..
Totals, North Island	230, 792	..	..	..	217, 473	..	..	..	..	..
Grand totals	404, 284	..	..	..	348, 644	..	..	..	..	..

NORTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

SOUTH ISLAND GROUPS OF STOCK-INSPECTION DISTRICTS.

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No. 3 stock-inspection district comprises the Counties of Clifton, Taranaki, Egmont, Stratford, Whangamomona, Eitham, Waikato West, and Hawera.

No. 4 stock-inspection district comprises the Counties of Patea, Waitotara, Wangarui, Raungitikei, Kiriwitea, Pohangia, Oroua, Manawatu, Kairanga, and Horowhenua.

No. 5 stock-inspection district comprises the Counties of Waipatu, Cook, Waikohu, Waioa, Hawke's Bay, Waipawa, Waipukurau, and Pataunga.

No. 6 stock-inspection district comprises the Counties of Weber, Dannevirke, Woodville, Pahiatua, Akaroa, Eketahuna, Masterton, Mauriceville, Castlepoint, Wairarapa South, Featherston, Hutt, and Makara.

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CEREALS INTRODUCED BY DEPARTMENT.

G. DE S. BAYLIS.

THERE are many of these which have now passed out of the sphere of co-operative experiments, stocks having been harvested from the original plots by the experimenters. These have again been sown, and probably portions of the yields sold to neighbouring farmers. In this way some of the varieties have been fairly widely distributed.

Mr. Radcliffe, of Masterton, has threshed 67 bushels per acre of Turkey Red wheat.

R. Warriner, of Greatford, has threshed 43 bushels per acre of Federation wheat. He reports, "I drilled 3 bushels per acre on the 6th September, with 2 cwt. slag. About one-third of this crop was a partial failure, owing to heavy rains just after sowing. It stands up well, is free from blight and rust, and is good to harvest. The yield for the whole paddock was 43 bushels. Harvested, 24th January.

Mr. McKay, of Masterton, is reported to have won from four bags of Hannchen barley 113 sacks.

Inspector Dunlop reports that W. R. McKenzie, Okaihau, Bay of Plenty, threshed 34 bushels of Red Fife.

Inspector Watson reports that Gray Bros., of Upper Tutaenui, threshed 52 bushels of Canadian Red Fife wheat.

Mr. W. Perry, Penrose, Masterton, had a good crop of Hannchen barley—a fine sample of grain.

I shall be glad to receive further reports from those who have grown any newly introduced variety outside the co-operative experiments.

WEED DISPLAY.

A FEATURE of the displays of the Department at the winter shows of this year is a set of ten weed-cards, exhibiting about a hundred and fifty varieties of weed-plants correctly named (with both the common and botanical titles) and with descriptive matter regarding them. The cards will be subsequently available for lending to rural societies who may desire them for the benefit of their members. A specimen card is illustrated on the following page.



THE HEMP INDUSTRY.

W. H. FERRIS.

THOUGH a slight improvement was noticeable in the hemp graded last month over the general quality of that of the earlier part of the season—this applying more particularly to the Manawatu district—there was still a high percentage of indifferent fibre forwarded for shipment. The improvement was specially observable where millers had good leaf to work with. It is unfortunate that much of the leaf being milled is diseased. Those handling it have had, consequently, to be content to work for a “fair” grade.

No doubt the better discrimination in market values between “good-fair” and “fair”—the London quotations having increased, from a difference of £1 10s. between the two grades in the beginning of this year to £3, according to the last cable from the High Commissioner—is responsible to a large extent for the improved quality being turned out by millers who have the desired quality of leaf.

OTAGO AND SOUTHLAND HEMP AND TOW.

Millers in Otago and Southland, although working with good-quality leaf, though this is a little on the short side, have been producing a lower grade of fibre, the predominant weakness being poor stripping. In some cases the fibre has been badly bruised, while in other instances the opposite was the case, the leaf being only partially stripped. In a few instances millers have maintained their hemp at a good standard. The weather has certainly been all against satisfactory work in the South, the bad drying-conditions being responsible for a considerable amount of hemp, well enough stripped, only reaching a common grade. It is satisfactory to be able to report, however, that practically all the fibre being produced in Otago and Southland is well scutched, and in this respect is in strong contrast to much of the fibre reaching North Island grading-stores. As in the North, southern scutching is done on the contract system.

Quite a number of Otago and Southland millers are sending in their hemp very carelessly baled—loose, and thereby making it very difficult for the storemen at the shipping-ports to properly dump it and make a presentable package. The same remark applies to tow. In several instances tow has reached the grading-stores with some of the bands

missing, and being merely unsightly bundles. This matter demands immediate attention. The oversea shipping companies have already made strong complaints in regard to it. While the tow in question has been badly baled, it has also been of a most unsatisfactory character. In some cases no attempt whatever had been made to free it from dust, while several lines came forward in such a damp condition that they had to be condemned for export. This is disappointing, as in the earlier portion of the season Otago and Southland tow was of fairly good quality. In view of the present strong position of the tow-market, and the increasing uses to which tow is being put, the indifferent manner in which it is too often prepared for export is much to be regretted.

Southern millers in general do not observe the regulations in regard to labelling as carefully as is desired, a weakness which is also complained of by the shipping companies. The required label is used, but the brand is merely cut in instead of being impressed in ink, with the result that the brands are frequently undecipherable.

OTHER PORTS.

While Westland hemp has receded in quality owing to unfavourable weather, that of Marlborough and Hawke's Bay is still of a good standard, the bulk of the fibre from these districts being "fine" and "good-fair."



SHIPPING WOOL AT LYTTTELTON.

APIARY NOTES.

F. A. JACOBSEN.

BEE-PARALYSIS.

THIS is not a prominent disease in New Zealand, but it is well to be prepared for it. The symptoms are a distended abdomen, with quivering wings. The only definite cure is dequeening the hive for about a fortnight, and the introducing of a young queen. A partial cure is effected by sprinkling the combs with sulphur. It is a summer trouble, and the true cause not being yet ascertained it is impossible to give any preventive advice.

FOUL-BROOD.

Ants may eventually prove a feature in the work of controlling foul-brood. It is well known they increase rapidly whenever an apiary is established, and are fond of stealing honey. Could they not be made to clean out combs of foul-brood, and the combs afterwards exposed to the sunlight as a further effort in the destruction of germs? Experiments are to be conducted on these lines next spring.

MOTHS AND INSECTS.

An excellent preventive against moths and insects of all descriptions is the use of carbon bisulphide. The supers of combs should be stacked in a pile, and a saucer full of the liquid placed on the top of the stack, this being protected with a hive-cover. The density of the evaporated fluid compels it to sink slowly through the combs to the bottom super, thus killing insect-life at all stages.

A SERIOUS EPIDEMIC.

In some parts of Australia beekeepers suffered severely last season through what has been termed the "disappearing disease." Whole apiaries were wiped out in the autumn by the bees simply disappearing, the colonies dwindling down till none were left. Some beekeepers reported that their colonies were reduced to such a weakened condition that they have had great difficulty in keeping any of them alive. The cause of the wholesale destruction is unknown, but steps are being taken to investigate the matter.

WINTER REMEDIES.

During winter keep your bees as warm as possible, and avoid an excessive amount of stores being consumed by the bees. The colder they are the more food they require to keep them warm, so use warm mats on top of the frames, and provide for each hive a substantial roof that will not leak.

Do not leave empty supers over your colonies during the winter, but put your bees down in the brood-chamber. This is to obviate the bees unnecessarily keeping a large instead of a small space at a living-temperature.

Do not let the bees starve, but observe closely the amount of stores consumed by colonies through the winter months, and feed where necessary.

The winter Shows provide an excellent opportunity for comparing notes with fellow-beekeepers. We can always learn from the experiences of others.

“ So work the honey bees,
Creatures that, by a rule of nature, teach
The art of order to a peopled kingdom.
They have a king and officers of sorts,
Where some, like magistrates, correct at home ;
Others, like merchants, venture trade abroad ;
Others, like soldiers, armed in their stings,
Make boot upon the summer's velvet buds,
Which pillage they, with merry march, bring home
To the tent royal of their emperor,
Who, busied in his majesty, surveys
The singing masons building roofs of gold ;
The civil citizens kneeding up the honey ;
The poor mechanic porters crowding in
Their heavy burdens at his narrow gate ;
The sad-eyed justice, with his surly hum,
Delivering o'er, to executors pale,
The lazy, yawning drone.”

—*Shakespeare*, Henry V, Act 1, Scene II.

The export trade in honey has received a great fillip this season by reason of growers in Canterbury and in Taranaki co-operating in the shipment of large uniform lines to the British market. At the request of the shippers, officers of the Department of Agriculture, Industries, and Commerce graded the honey prior to shipment, an arrangement of distinct advantage to both the growers and the industry.

ORCHARD WORK FOR JULY.

W. A. BOUCHER.

PLANTING.

IN many localities in the Dominion the planting of orchard-trees during the month of July is to be avoided, on account of the unsuitability of soil and climatic conditions. Usually at this season of the year cold and more or less wet weather prevails. Under such circumstances the soil is not in a satisfactory condition either for working or for planting. It is far better to wait for a later period, and set out the trees when the soil is warm, friable, and moist, but not wet. Consignments of trees arriving from the nursery should be carefully heeled in until such time as the soil and climatic conditions are favourable for planting the orchard. To heel in, prepare a trench in moist friable soil, either with the plough or spade. When the trench has been prepared lay the trees in, either singly or in small bundles; shovel in the loose earth, shake it in among the roots, and press down fairly firmly with the foot. The object in view is, as far as possible, to prevent the air from reaching the roots during the period in which the trees must remain in the trench.

SPRAYING.

During the month of July spraying for several pests and diseases can be satisfactorily carried out—in fact, every opportunity should be taken of suitable weather-conditions to push on the work, in order to avoid an unnecessary rush at a later period. Mussel scale, red spider, and mealy bug should receive the careful attention of growers, and every effort be made, by thorough spraying with the red-oil emulsion, to as far as possible eradicate these pests from the orchard. It has been noticed that fruit infected with all three pests has arrived at the markets from districts and orchards where spraying is regularly practised. A Fruit Inspector naturally has no desire to find unnecessary fault, but in the course of his duties must draw the attention of growers to the fact that pest-infected fruit is coming forward, although he may know that spraying for the control of the pests has been carried out. It is then for the grower to investigate and find out the reason why, even in spite of spraying, the pests are still in evidence. The question of results is a most important one. The principal cost involved in spraying is that of labour, so that every effort should be made to

secure and effectively apply a material that will produce the results desired. It should be remembered that the cheapest spraying-materials are not always the best, and that the saving of a small amount in the cost of material may lead to considerable loss in the cost of labour and possible loss of fruit. It is especially desirable that only compounds of proved worth should be used, in view of the export trade that is now being established. It is obvious that only fruit free from pest or blemish of any kind should be sent to foreign markets, and to secure such fruit the most thoroughly effective spraying with compounds of proved value will be required.

PRUNING.

Pruning operations may now be carried on with advantage. It will be necessary to cut back young trees and thin out older ones. Where canker is known to be present in an orchard special attention should be given, and care exercised to see that infected twigs or limbs are cut back to clean healthy wood. It is not infrequently the case that prunings are left to lie about in an orchard or garden or in the vicinity. All prunings should be gathered up and burned, as some diseases, at any rate, are carried over from season to season in the diseased bark or wood that has been removed from infected trees.

PEACHES AND NECTARINES.

Fruit-trees of this class that have not already been sprayed should receive an application of the Bordeaux mixture—10-10-40 formula. It is important that a first spray should be applied as soon as possible after the leaves have fallen, in order to protect the bark of the trees, and especially the leaf and blossom buds, from attack by the die-back fungus (*Clasterosporium carpophilum*).

GOOSEBERRY LEAF-SPOT.

Gooseberry-bushes should be thoroughly sprayed with the Bordeaux mixture, 10-10-40 formula, to protect them against attack by leaf-spot, which in many instances of late years has proved fatal to the crop, and in some cases to the bushes themselves.

Raspberries and currants will also benefit by the application of the Bordeaux mixture—10-10-40 formula.

ERRATUM.

Journal, Vol. vi, p. 509, 15th May, 1913, "Analyses of Soils": The amount of citric-acid soluble potash in soil from Waihao Forks (last on list) should read "0.010 per cent.," not 0.100 per cent."

GRAPE - CULTURE.

S. F. ANDERSON.

VINE-HOUSE NOTES FOR JULY.

ALL pruning of vines in the cool-house should be completed this month.

Where vine-borders have been mulched with stable manure or other material during the past summer it should now be forked in, provided the weather is suitable. If the vines require further manuring a light dressing of bonedust may be first spread over it, and the forking-in proceeded with. In applying artificial manure to vine-borders—that is, those manures other than stable or farmyard manures—the custom has been in most cases to apply them in excess of what the plants can really take up. When this is done, the excess of plant-food they contain is washed away by rain or it sinks down into the lower soil, and, so far as the vine-roots are concerned, is lost. The quantity applied to farm crops is the best guide. With soils of medium quality the usual dressing given of bonedust is from 2 cwt. to 3 cwt. per acre. Reduce the application from acres to square yards, and adjust it to suit the borders of a vine-house 51 ft. by 16 ft. The borders of a house this size should extend 10 ft. all round it. This would be a piece of ground 71 ft. by 36 ft., or 284 square yards. At the rate of 3 cwt. to the acre, this is a little over $1\frac{1}{10}$ oz. to the square yard, and would take 20 lb. only of bonedust. If the house is situated on high land, and the soil be below medium quality, increase the fertility by addition of stable manure or a top-dressing of an inch or more of rich soil, in preference to artificial manure.

In vine-houses where the laterals or fruit-bearing shoots have become weak and spindly this must not in all cases be put down to a want of forcing by manure. The cause of it is nearly always overcrowding and depriving the vines of their foliage during the growing season. Where this practice has been continued for a number of years the inevitable result is weak growth. Provided good pruning and cultivation have been given a vine, it takes many years before a falling-off is shown in the vigour and fruit-bearing quality for want of manure. It is then quickly restored by a top-dressing of bonedust or of good soil.

Considerable loss of fruit has been noticed during the past season from snanking. One of the chief causes of this is insufficient draining. When vine-borders are being made, the drainage from them in some instances is not deep enough to carry off the soakage from the bottom of the border. The vine-roots getting into a cold clayey subsoil inevitably results in their becoming weakened and subject to disease. There is no plant in horticulture more easy to grow than the vine, or one that responds more generously to common-sense treatment.

VINEYARD NOTES FOR JULY.

If not already done, the pruning should be pushed forward. July is the worst month of the year for outdoor work usually, especially where working the soil is concerned. The beginning of June is the best time to commence pruning, because it can rapidly be followed by the gathering-up of the prunings and the ploughing. In nearly all the vineyards in the Dominion vines are grown on espalier fences, and to cover up weeds, and manure where applied, a winter ploughing is done. Only one ploughing in the year is recommended. All other working of the soil should be done with the cultivator. The spring-tooth cultivator is a fine implement for this. In ploughing vines that are grown on espalier fences it is necessary to have headlands of ample width for turning out of one row into another with two horses. The vineyard should be divided off by the ploughman into lands of so-many rows each. Eight is a convenient number. Strike out down No. 1 and up No. 5, down No. 2 and up No. 6, down No. 3 and up No. 7, down No. 4 and up No. 8. This completes the first round. This allows of easy turning into the rows. Having done this, reverse the order, commencing at No. 8 and finishing at No. 1. This throws the two furrows (which should be 6 in. deep) up against each other. Care must be taken that no core is left between the two. It may not make a pretty job, but it breaks up the centre completely. The next two furrows on either side should be 5 in. deep, the next two 4 in., and the finishing ones next the vines 2 in. Throwing the soil into the centre a little does not matter, and it helps to aerate the whole better; when the cultivator gets to work in the spring it is soon levelled down. Graduating the depth of the ploughing from the vines to centre of the row drains the water to that place, to soak away after rain. Hence a warmer condition for the vines, and less chance of mildew in the summer. The work should be done by an experienced ploughman with a single-furrow plough.

THE FARM GARDEN.

W. H. TAYLOR.

TOMATOES AND BLIGHT.—A RETROSPECT.

At the time of writing—12th May—we have just gathered the last ripe tomatoes of the season. Frost has killed the plants, or there would have been a few more. Blight is very common in this district every year. The crop just over is the eighth I have grown at the Weraroa Experimental Farm, but only once have I been troubled by blight. Last year, when the crop was two-thirds gathered, it suddenly appeared during some very wet weather. Very little spraying is done in these parts—the plants being sprayed sometimes once, but generally not at all. There were absolutely no tomatoes in the district during two seasons except at this farm. The reason for this immunity is, I believe, because I have always worked on the plan advised by this Department—viz., I never manure at the time of planting. All the manuring done is the giving of a dusting of superphosphate and bonedust after the first fruits are set. The fertilizer is hoed in with a flat hoe, or with a sharp rake. Inquiries made from people who have lost their crops through blight have always elicited the fact that the plants were well manured, and, in some cases, frequently watered. The general opinion appears to be that, being a strong-growing plant, the tomato requires a lot of feeding. Thus every means are taken to build up the very thing that should be most avoided—a soft, gross plant. What is really required is a tough, firm growth. We should aim, in fact, to correct the natural gross habit of the plant, by growing it in only moderately good ground, and also, by constant repression of shoots, to prevent a lot of growth. There is another source of blight worth mentioning. All efforts to grow a hard-wooded plant may fail if the surroundings are not conducive to that state. A perfectly open situation and full exposure to sun are necessary. And an otherwise open situation may be completely altered by growing the wrong crops in close proximity to the tomatoes. A case in point: A plot of ground, through which ran a row of tomato-plants, was sown with partridge peas, to be dug in as green manure. The peas made strong growth, covered all the ground, and stood up about 15 in. above the surface. At early morning the pea-haulm was reeking with moisture, and the sheltering growth kept the ground wet all day, thus creating a

moisture-laden atmosphere about the tomato-plants, which were on the side of the pea-patch opposite to the windy quarter. When blight was reported on a plant where I expected its appearance the plant was at once pulled out and the peas dug in.

Overfeeding.—Along the same lines as overfeeding tomato-plants, mistakes may be made with other things by those who are the fortunate possessors of a good supply of stable manure. Certain plants are said to require "high cultivation" or "good cultivation," but the terms are often misunderstood as meaning a tremendous lot of manure. "High cultivation" is often used to indicate that a certain thing requires skill, with or without much feeding. The highest cultivation is to give a plant exactly the treatment it requires, perhaps with no manure at all. Some years ago there were a series of losses that caused much debate in a certain part of New Zealand. A mysterious disease killed all the asters in a rich man's garden. Our scientists could find no disease. There was none. The explanation, I believe, was to be found in the fact that too much manure had been applied. The ground was given all it would hold, and as soon as the plants were established in the ground a heavy mulch of rich manure was put about them. The result was that in a very short time they were certainly remarkably fine plants, but then came an extra hot day, and the plants laid down and died, simply collapsing. In the course of two or three weeks all that had made strong growth were dead. The reason for the collapse was that the ground was so rich that the plants made tops out of proportion to the roots. When the stress of hot weather came the roots were not able to supply sufficient moisture to the tops to compensate for the loss by evaporation. There can be no doubt but that overfeeding predisposes plants to disease.

VEGETABLE CULTURE.

A knowledge of how plants behave in different circumstances is necessary to an understanding of what is right. Tomato-plants grow far too strongly in our climate. In a hotter and drier climate they are not so rampant, and in such circumstances more manure would be required. Rhubarb and cauliflowers are worthless unless they grow very strongly. Both are liable to collapse if insufficiently fed. Rhubarb, it is well known, will die in early autumn if unable to find sufficient food. It may be useful to state the manner of the collapse. In the first place, the leaves turn yellow in patches; this colour gives place to red, deepening to crimson. The stalks turn brown and soften, and the leaf falls. This takes place over the whole clump, and the crowns rot away. Cauliflowers and plants of the same family when imperfectly fed are subject to a trouble known as "malnutrition

disease." The plants make very poor growth, and the leaves are spotted with black. The fact that the leaves are spotted need not necessarily be due to want of feeding, because there are other diseases causing such an appearance. It is necessary to have some understanding of the requirements of the various subjects to be grown if good crops are to be raised. By this time a general plan for next season's planting and sowing should have been arranged. I am supposing that manure is available—and nothing else is so good for many crops. Ground newly manured is not good for underground root crops, such as parsnips, carrots, beet, artichokes, and potatoes. The last-named, advisedly, will be referred to again. Peas, beans of all kinds, cauliflowers, cabbages, lettuce, turnips, spinach—all thrive best on freshly manured ground. The best plan is to alternate the crops: manure well for those last enumerated, and in the following year use the ground for the previously mentioned crops, applying a little artificial manure as well. Celery and rhubarb cannot be overmanured. Rhubarb is, of course, not merely an annual tenant. Celery, to be well grown, has to be planted in deeply dug and heavily manured trenches. The digging of the trenches and the various operations of moulding up give the ground a very fine tilling, and the remains of the manure produce a lasting benefit. This year's celery quarters are the best possible place for next year's parsnips. The soil will be in good tilth: the manure being low down and the strength having gone from it, the roots work freely, and go down to the manure, which is too low to have any effect in causing them to fork, as fresh manure dug in will do. Where stable manure is scarce recourse may have been had to tares, clover, or partridge peas for a supply of humus to dig in.

Some say that winter cover-crops will keep down weeds, but this is a delusion and a snare when applied to vegetable-gardening. If any such crops are now growing, or if there is any weedy ground, dig them in at once and give the soil the benefit of a good airing before seed-time. This will do more good than a little extra green growth, and will afford an opportunity of getting rid of slugs, for cropping with legumes has the serious disadvantage of forming a nursery for slugs. In the ordinary course of gardening, slugs disappear in the hot weather and are not troublesome again till spring. If you grow patches of partridge peas you will have them all the time. We have found it so to our cost.

To return to potatoes and manure: The general opinion is that maiden pasture land is best for potatoes, without using manure of any sort. My own observations verify this. But it must be good land, and the turf turned under in autumn. Given land of fair to good quality, such as that around me, it can be cropped two years with

potatoes without manure. The second year usually gives the better crop, doubtless because of the complete disintegration of the turf which had not taken place in the first year. The addition of farm-yard manure to such land has been proved to be attended with disastrous results. A large amount of haulm is produced with a poor crop of tubers, and the overluxuriant haulm is predoomed to blight. But all land will not grow potatoes without manure, and where this is the case it is necessary to apply it. The same must occur in gardens that are under continual cropping. Manure may then be given with safety. But I conclude as I began, by stating that the best potatoes are grown without stable or farmyard manure.

In the working of a garden there is from time to time necessity for fires, to burn up rubbish of various kinds. The remains of these fires are of value. If branches have been burned, so as to leave a residue of wood-ash, it is worth while putting the ashes under cover as soon as they are cold and before much rain has fallen on them. If a corner of a shed is available, or a corner sheltered with a few sheets of old corrugated iron so as to keep the ashes dry, they will be valuable as a top-dressing to soil prepared for onions. We always do this, and spread the ashes just before we draw the drills. When the fire-remains consist more of burnt earth than of wood-ash they should be wheeled to a convenient place, where they may lie for a time, not sheltered from rain in this case. These ashes are very useful in a variety of ways when the lightening of heavy soil may be desirable, or for mixing with compost for raising seedling plants.

CURRENT WORK.

General seed-sowing will soon be the order of the day. There is also a certain amount of planting to be done. Planting should include rhubarb of the summer varieties, cabbage, cauliflower, lettuce, onions, garlic, shallots, potato onions, and potatoes for early supply in places not subject to frost.

Pea sowing begins now in the ordinary course. Varieties have been dealt with in recent issues of this *Journal*. Sow a dwarf variety for first uses, and, at the same time, a taller one to succeed them.

Broad beans may be sown, if not in before.

Carrot seed of Early Horn type may be sown in small quantity.

Lettuce seed may be sown.

Onion seed may be put in wherever the soil is in a fit state and can be relied on to remain so, always bearing in mind that, though the earlier they can be got in the better the chance of good crops, it

is bad practice to sow seed if it will be a long time coming up, or if the plants linger in growth after they are up, as will be the case if the soil is cold.

Onions require a firm seed-bed on soil that will not cake under heavy rain. Drills should be very shallow, merely deep enough to allow for covering the seed. Soot is a very fine fertilizer for onions, and helps to keep insect pests away. It should be broadcasted before sowing the seed. Superphosphate is also a good fertilizer, and should be broadcasted as though it were grass-seed and about as thick as you would sow grass-seed.

Rhubarb should be planted in rich ground, in rows about 3 ft. apart, and 30 in. to 36 in. apart in the rows. The sets should be put in so that the crowns are barely covered. Where there are old beds of rhubarb, with the clumps getting broad, they are probably deteriorating, and should be dug up and chopped in pieces. They will make as many new sets as can be secured with crowns. One or two strong crowns are enough for a set. It is best to take the plants up after three years. Sometimes, to save the trouble of lifting, the outer parts are chopped off, but this is hardly a good plan, though advised by supposed great authorities, for it is evident that the young parts are destroyed and the old parts kept.

Cabbage and *cauliflower* plants put out should be from the autumn sown bed. Older plants may be available when the latter are not, but it would be bad policy to plant them, as they would be almost certain to bolt to seed without heading in.

Lettuces may be planted as soon as young plants are large enough, if the bed of young plants is sufficiently extensive. Those wanted for planting should be drawn out in such a way as to leave some plants undisturbed and a few inches apart. Those so left will provide the earliest cutting. In damp situations the lettuce-beds should be raised. Beds should be about 5 ft. broad with a spit-wide path between, in order that weeding can be done from each side without treading between the plants.

Onions planted now are to secure large bulbs—that is, proportionately large according to variety. The usual object in sowing onions in autumn for transplanting is to produce large bulbs. For this purpose varieties of the Rocca and Ailsa Craig type are sown. These must be allowed room in proportion to their size. The rows may be 15 in. apart, and a 12 in. space between the plants is not too much if the soil is good and has been supplied with stable manure. If less rich allow 10 in., as we do without stable manure. Bulbs may be expected to vary from 2 lb. to 3 lb. each in these conditions, being heavier where they have stable manure to feed on. Give a top-

dressing of wood-ashes if at hand before planting. There are various ways of planting. It is best not to let the plants get long beforehand. Care must be taken not to bury the stems; just the roots and the smallest possible portion of the stems should be covered. It is best not to try to make them stand upright. Let them lean on the ground. They will right themselves very soon after they begin to grow. The smaller varieties, those of the Brown Spanish type, should be planted closer—say, 5 in. or 6 in. apart. For these the most expeditious way of planting is to draw a shallow drill. The marker used to drill for seed will make drills deep enough. Lay the plants on their sides, with the roots in the drill, and push in just enough soil to cover the roots.

SMALL FRUIT.

Gooseberry bushes may now be pruned. The chief object sought should be a bush with branches so arranged that it will be easy to gather the fruit. This means that they must not be very close together, and that the centre of the bush should be open. Varieties of a drooping habit should be pruned with a view to counteracting this tendency. Shoots pointing downward should be removed, or if this is not desirable they should be pruned to an upward bud. There is no necessity for much shortening of side shoots. It should be remembered that the young wood will bear fruit, and that the quantity will be in proportion to length of this. While it would not be wise to leave the shoots full length and institute a state of overbearing, which would result in poor fruit, it is preferable to shorten those on the outer and upper parts by about one-third, and those in the inner and lower parts of the bush back to spurs. Gooseberry-bushes may also be planted now. Plant 5 ft. apart. The most profitable variety for culinary purposes is Farmers' Glory, a very large and prolific sort. This is the variety I recommend for planting in quantity. The good points of some varieties are lost in this part of the world, where jam from ripe gooseberries is practically unknown. This is a pity, for preserves from ripe fruit are very superior to those made from green. Ironmonger (Rough Red) and Warrington are the two famous jam-making varieties in the Old Country—that is, when the ripe fruit is used. Broom Girl, China Orange, High Sheriff, Pineapple, Gipsy Queen, Red Champagne, Overall, Gregory's Perfection, Freedom, Whitesmith, and Jolly Miller are all good desert varieties.

Many attempts to grow *red currants* have proved futile, partly through wrong pruning, but mainly through planting wrong varieties. Pruning consists in securing an open framework of leading branches. All side shoots are to be pruned back to short spurs, for the red currant never bears fruit on the young shoots, but on spurs on older

wood. Reliable varieties are Chenanceaux, Cherry Red, La Versaillaise, and Fay's Prolific.

Black Currants.—The chief difficulty with these is the borer. A proper system of pruning, however, pretty well conquers it. But it is useless to attempt to grow black currants unless soil and other conditions are suitable. There must be plenty of moisture all through the summer, with a cool subsoil. This state can be provided by deep trenching and plenty of strong manure. In the absence of manure do not try to grow black currants, unless the soil is of an exceptional character, retaining moisture throughout summer. In such cases artificial manure will supply the place of natural manure. Black currants bear on the young wood, and this should be encouraged, cutting away old wood to make room for young. Young side shoots should be slightly shortened, not much beyond removing the tips which are immature. There is this vital difference in the training of the red currant and the black: that whereas the red must be trained to a single clean stem from the ground, no suckers whatever being allowed, the black currant should be encouraged to make suckers, and these should be preserved in sufficient number to enable the gradual and continual renewal of the bush by cutting out the old branches to make room for young suckers, not doing it all at once, but a little each year. This method promotes continual youth in the bush, and prevents the borer from doing much harm.

Raspberry canes should be thinned out to about 6 in. in each clump, and should all be shortened by about 12 in.

Loganberries.—Young rods that have been preserved, as previously advised, should be laid in in place of old ones, which after bearing twice should be cut out. Rods that have borne fruit last season and are to be retained will be furnished with the shoots that carried the fruit. These should be cut back to short spurs.

FLOWER-GARDEN.

Complete rose-planting as soon as possible, and prune established bushes. Pruning varies for the different classes, and even for individual varieties occasionally. With hybrid perpetuals there is a general shortening of shoots in a severe manner. It should be the aim to produce shapely bushes, therefore the centre stem should be the highest. Roughly stated, leading shoots should be shortened to one-third of their length, and side shoots to two eyes. The first thing is to remove entirely any spindly shoots there may be, and any dead wood, any extra gross or soft shoots, and any that appear to threaten to crowd the bush. Frau Karl Druschki and J. B. Clark are both exceedingly strong, and must not be cut back so severely. New long shoots may

be tied over like a bow, and not shortened, but remove some of those previously treated in the same way. Or the shoots may be somewhat shortened according to strength, leaving them from 6 in. to 10 in. long. I find this plan answers well. Remember when planting these varieties to allow them plenty of room, as they make large bushes. Thin out old twiggy branches of tea roses, to make room for young growth, and remove weak spindly stuff; shorten the remainder only slightly. Clear out the centres of polyantha roses, and shorten remainder by one-third. Lay in young rods of climbing-roses, and remove old rods that have become twiggy. As a rule it is best to remove a rod after it has flowered twice. All side shoots should be cut back to spurs.

When cleaning up the *borders* it is usual to do a certain amount of pruning to the various shrubs. This kind of thing should be done with understanding, and with a view to develop the characteristics of the individuals, and not to make them all alike by cropping with shears. *Prunus pissardi*, the purple-foliaged plum, is a beautiful tree if allowed to assume its natural habit. It should be trained up as though it were an ordinary plum-tree, only the centre instead of being hollow should be full—the style, in fact, of a standard cherry-tree—viz., a clean stem for a few feet, then main branches radiating equally around so as to form an even head, which should not be crowded. The flowering-cherries should be similarly treated. The generality of flowering-shrubs should not be pruned at this time, the exception being the case of late-flowering varieties. The pruning of all flowering-shrubs should be done immediately after flowering, whenever that may be, and it is not, in proper practice, permissible to do anything more now than to cut away straggling branches of the early flowering-shrubs.

Hydrangeas may be shortened back to strong buds in the case of the old flowering-shoots. These end in the dead flower-head, but those shoots that are terminated by foliage should be left untouched, as the ends of such shoots will develop blossoms. This reminds me of an old way of furnishing nice little plants for house-decoration. If a watch is kept on the leafy shoots of the hydrangeas they will presently show the beginning of the flower-heads. As soon as this is seen cut off the shoots just below the second joint, pot them singly in 3 in. pots in light soil, and plunge them in a hotbed. They will soon root. Then take them out to a cooler frame, water with weak liquid manure every time, and they will develop heads of flower 5 in. or 6 in. across.

A hotbed is very useful at this time for raising seed and striking cuttings. When July is well in, a start may be made with the sowing of half-hardy annuals, &c., under glass; and in places free of frost hardy annuals may be sown in the open ground. Pansy-plants should be got into their beds. These like cool weather, and get a strong start if out early, giving the best flowers of the season towards the end of spring.

THE POULTRY INDUSTRY.

F. C. BROWN.

JULY WORK.

JULY may fairly be considered the most important month in the poultry calendar. Profitable production implies profitable stock, and the securing of this rests, in the main, on the foundation blood and the manner in which this is mated and handled. July is therefore the crucial month, the time when the judgment of the poultryman is put to the most severe test. If he acts with the desired judgment arising from the many lessons taught in the course of keen practical experience he will study industriously his breeding operations, and be guided by the sound underlying principles upon which the successful breeding of all classes of stock rest. The A B C of this is that like begets like, and that no stock can be too good to place in a breeding-pen. Many poultrymen consider that the incubating and brooding stages are the main considerations, but these are only necessary links in the chain. The quality of the parents is the first consideration. In last month's issue some advice was given in regard to mating, and Felch's valuable line-breeding chart was reprinted. Too much importance cannot be attached to this. To succeed in poultry-keeping everything must be ordered on the most exact principles. In the first place, the breeder must know exactly what he is doing, and this implies a correct knowledge of the history of the birds he intends to mate. Happily, in these days it is at times possible to obtain information of the pedigree of performance, some idea of the hereditary productive capacity of fowls. Having this both on the male and female side, a poultryman knows just what he is doing in forming a breeding-pen, and if his information as to the pedigrees of performance is correct he cannot go wrong if he has at the same time attached due importance to constitution, the possession of which is imperative to secure heavy laying-stock with the power to produce to their full capacity. A common mistake made, even by those who realize the importance of breeding only from the desired stock, is that they attempt too much, and therefore mate up birds which should never be bred from. Careful mating means a smaller percentage of cull birds. It is, however, an unfortunate thing that culling of the young stock is either not sufficiently drastic or is neglected altogether. The careful

poultryman who is keenly intent on raising the productive character of his flock, and thereby making poultry-keeping the payable business it should be, will appreciate the necessity of more care in mating up the breeding-pens, especially in seeing that only the most desirable birds are used.

DAY-OLD CHICKS.

A correspondent is anxious to know if there is any danger in purchasing day-old chicks, especially from a man who says he has orders already booked for several thousands. I can only reply in the affirmative. The day-old-chick method of rapidly establishing a flock is an excellent one, provided, however, that there is some guarantee that the chicks purchased come from approved and selected laying-stock. If a man is turning out day-old chicks by the thousand it is obvious that he must have an enormous number of breeding-stock from which to select the necessary number of breeding-pens, or he must be breeding from all his stock irrespective of quality. This is where the possible danger comes in, as, while the day-old chick from good breeding-birds is all right, the chick from cull stock is all wrong. It is the difficulty of making sure of obtaining the former where the drawback to this method of stocking up comes in. Some breeders supplying day-old chicks have very even flocks, and are capable of making up a large number of good breeding-pens, and are thereby able to send out chicks which should develop into payable stock; but, on the other hand, there are no doubt flocks in which only a comparatively small percentage of the birds are fit for breeding from, and if the owners of these are tempted to supply large numbers of day-old chicks they will find it a very difficult matter giving satisfaction to their customers. After all, it is the same in all branches of stock-dealing. It is not every one who is naturally a successful breeder, and if good stock is to be secured the successful and reliable breeder must be looked to.

BAD LUCK!

Bad luck has a lot to answer for; it is the cause of so many failures in poultry-keeping. A hatch fails—because the board that was put in front of the nest to make the hen feed was not taken down again. Bad luck! The hen neglected the eggs—because she was tormented by vermin. Bad luck! Chickens were lost—drowned in a deep water-tray. Bad luck! Chicks drowned again—by water getting under the coop. Bad luck! The hatch failed in the incubator—the lamp was not filled at the right time. Bad luck! Another hatch failed—the wick was not renewed. Bad luck! A poor hatch—the eggs when taken out to cool were forgotten. Bad luck! A

second poor hatch—something had been thrown on the regulator. Bad luck! Infertile eggs—the breeding-pen had been neglected. Bad luck! A spoilt hatch—thermometer broken, and a spare one not on hand. Bad luck! Chickens died from bowel trouble—the lamp went down in the brooder. Bad luck! More chicks died—food ran out, and had to feed something else. Bad luck! Still more died—shut them out of the brooder, and forgot to let them in again. Bad luck! The best of the lot went—to the rats. Bad luck! No eggs—forgot to feed the fowls. Bad luck! Still no eggs—fowls roosting in trees. Bad luck! Again no eggs—raining for days, and no dry scratching-place. Bad luck! Pullets moulting—hatched too early. Bad luck! Some hatched at the right time also moulting—had to change their food and quarters. Bad luck! Disease breaks out—had too much stock, and overcrowded the houses. Bad luck! Lost money—thought anybody could run poultry. Bad luck! And so it goes from year to year. It is the bad luck that is the cause of all the failures.

There are some people, however, who start on a sound financial footing, understand something of poultry-keeping, consistently endeavour to improve their methods, and conduct the business in a careful and methodical manner. Somehow they never have bad luck. Certainly they occasionally, like human beings in general, make mistakes, but these seldom are of any moment. They succeed in the things that really matter, and thereby make poultry-keeping the profitable work it is to those who thoroughly understand it, and treat it as a serious proposition to be mastered and conducted on the same strict business principles as any other commercial undertaking.

THE OVERFEEDING MYTH.

It is surprising the number of people who continue to believe that the heavy layer can be overfed. We never hear any warning being given the dairy-farmer not to overfeed his heavy milkers. True, with both the egg type of bird and the deep-milking cow the feeding of highly concentrated food can be overdone, but food of the right description can never be fed in excess in either case. In the old days, when birds were only capable of laying half the eggs now regarded as essential to profitable production, it was possible to make the birds overfat, and consequently unhealthy. It is very different with the type now favoured—birds bred according to a pedigree of yielding-capacity, and shelling out a two-ounce product of the most highly concentrated material known in the animal kingdom day after day for probably over 200 days out of the 365. Obviously such birds must have the necessary material from which to manufacture their phenomenal product

and at the same time maintain the bodily vigour necessary to enable them to do so, especially in cold weather, when any stinting in the food-supply is fatal to production. In the hundreds of visits I pay to utility-poultry plants during the year I invariably find that it is only where the food is supplied with an unsparing hand that the egg-yield is satisfactory, whereas where any attempt is made to calculate the allowance for each bird the results in egg-yield are generally disappointing. Only the other day I visited a man who had 320 fowls, and who was not only feeding them on the special ounce a bird at the evening meal sometimes advocated, but was not as careful as he might have been as to the time when he fed them. His egg-yield was actually less for the month than that of the fifteen birds of a neighbour who believed in giving his fowls all they could eat. Of course, it is not everybody who follows the latter principle who gets the eggs he should. He may scatter the food broadcast, but if he fails to keep the birds provided with fresh water and grit his returns will still be disappointing. Again, he may not have the right class of birds. The man who stints his fowls cannot have that true regard for animals which a man must possess to make a success of handling any class of live-stock. Hand-in-hand with spare feeding is generally found a neglect of those many details strict attention to which is essential in managing poultry to advantage. The houses are unclean, and vermin is abundant—the blood-sucking insects making a greater drain on the animal system than the heaviest laying—the yards are foul, and water, grit, and green stuff are seldom in constant supply. He who stints his fowls would be better employed at some other occupation.

HOW TO TELL THE LAYER.

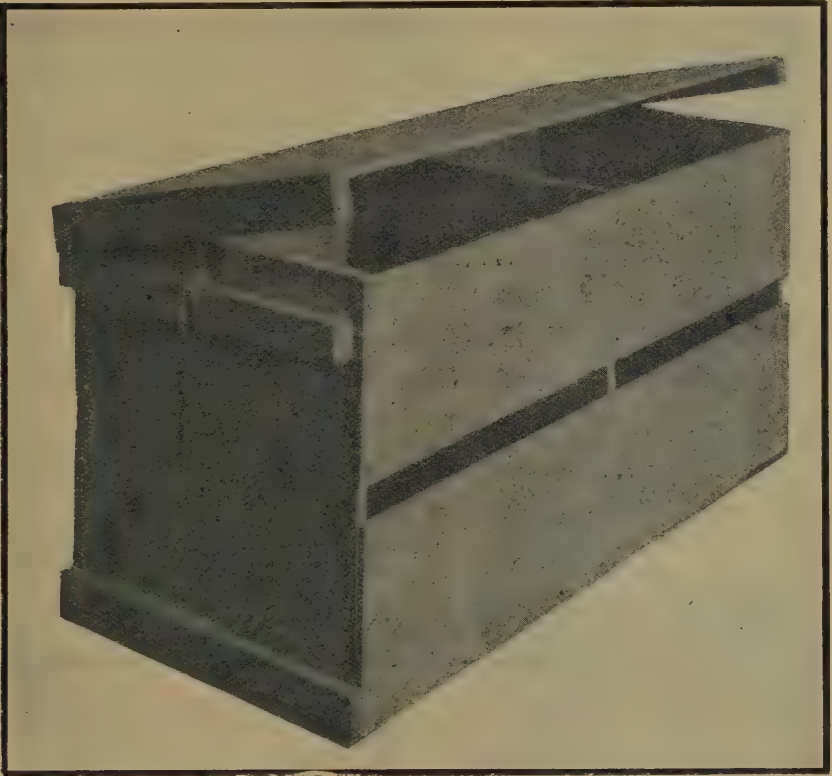
A correspondent is anxious to know if there is any means of telling by the outward form of a bird whether it is a layer or not. There certainly is, but it is only the man with a keen eye for form and who is a student of type who can readily distinguish between laying and non-laying birds. I cannot do better to emphasize the difference between the two types than instance the striking difference in form between the beef-forming cow and the dairy type. The former is of a blocky build, while the deep milker has all her development concentrated at the business end. Thus, while she should be fine in front she has a great barrel and exceptional width and depth in the milk-producing regions. So with the heavy layer. She naturally must possess exceptionally generous development in the latter half of her anatomy, where the egg machinery is located, tapering to that fineness in her fore end which is always indicative of a highly developed nervous temperament, the natural characteristic of the

heavy producing animal. The non-layer, like the beef type of cattle, is square and blocky with a rather sluggish temperament. A man with any eye at all for form should be able readily to distinguish the two types. It is impossible to estimate from the appearance of a bird the extent of her laying-capacity, but it is easy enough to tell whether or not she is of the laying type. One character which must go hand-in-hand with the laying type is the possession of the desired constitution. This qualification is indicated by bright feathering, a bold bright eye, legs well apart (as they should be in the laying type in general), and the possession of a very active disposition. Of course, there are individual birds which conform to all the desirable points looked for in a heavy layer and yet fail to prove satisfactory layers. This is due to some weakness in construction or an abnormal development not observable to the eye. I once picked out a bird which I considered was a capital type of a layer, but found on handling her that she had a large tumour in the abdomen. The eye for form is a natural gift, but it can to a very large extent be developed by close study and observation.

NEW ZEALAND EGGS IN LONDON.

A correspondent, in expressing appreciation of the results of the Department's experimental shipment of eggs to London, is anxious to know if the eggs were specially selected, or were they but a fair sample of the eggs ordinarily sold on New Zealand markets, as, he writes, the London *Dairy* made this remark on the shipment: "They were found to be in splendid condition, and could fairly rank as new-laid. They compared favourably with anything on the market, and hardly one was broken." The eggs were certainly an exceptionally good line. I personally selected and packed them. They represented three days' yield of the flock of the Heretaunga Poultry Plant, Wellington; and as the flock of 1,500 birds is entirely of the White Leghorn breed, singularly uniform in type, while the birds at the time of year (December) were of an adult age, the eggs were a very straight line, fully 90 per cent. being first grade. These were selected for shipment. As the birds have roomy scratching-quarters, clean nests, and good grass runs the eggs were particularly clean. Again, the fowls being well fed and supplied with an abundance of green material (watercress), the eggs were as good internally as their outward appearance suggested. The eggs were infertile, which is imperative in catering to a distant market. They were packed in Canadian cases, holding thirty dozen each. These cases are made of very thin wood, with openings between the slats, but having stout ends. They are divided in the centre by strong boarding. The eggs were packed in manila cardboard fillers—strawboard is unsuitable, as with moisture it imparts a

musty flavour to the eggs. On each tier of eggs a sheet of manila cardboard was placed. These were specially perforated for the London shipment, in order to allow as free a circulation of the cold air through the package as possible. The Canadian case is illustrated herewith. I have to express appreciation of the keen interest taken in the shipment by the refrigerating staff of the s.s. "Rotorua," by which steamer



THE CANADIAN EGG-CRATE.

the eggs were shipped to London. No doubt the care taken of the eggs on the oversea voyage was largely responsible for the excellent condition in which they reached the Home market.

QUALITY VERSUS QUANTITY.

While the laying competitions have rendered the industry excellent service in developing the laying-power of certain breeds of poultry, this should not be their only objective. The day is passing when the consumer will purchase eggs irrespective of quality. He will demand,

even with the guaranteed fresh egg, that it be of a certain weight. The recognition of weight in the eggs laid by the respective pens in the competitions becomes therefore a matter of prime importance. It is gratifying to see the publication of the weight of eggs produced by competing pens at the last test, the figures disclosing valuable comparative data, clearly indicating that the number of eggs produced is not everything, and that we can obtain a yield at too great a cost. While the Utility Poultry Club is to be congratulated on the information furnished, this would be much more valuable and be appreciated more highly were it supplied month by month during the currency of the test. For instance, poultrymen are naturally guided as to the source from which to obtain their stock and settings by the progress reports of the competition results; but if only the number of eggs laid is supplied, a reliable guide as to the breeding-quality of the stock of competing breeders is not made available. No wise poultryman will use a small egg for breeding purposes, and he runs a very good risk of securing these if he is guided merely by the number of eggs produced by certain competing pens. Many breeders are pinning their faith to an export trade as a means of unloading the summer surplus, but they will find the critical oversea markets will not pay full rates for under-sized eggs, and only the best values will warrant the export business. Especially is it necessary to remember quality in initiating a trade.

THINGS TO REMEMBER.

Give the breeders ample exercise.

Strong chicks imply strong germs, and strong germs come only from vigorous breeding-stock.

Do not force the breeders, but provide nourishing food with ample green stuff.

Study nature, and especially at mating-time provide natural conditions as far as possible.

Always have spare breeding-birds in case of accident, and where the breeding season is prolonged a change of male bird is desirable.

Do not cut off the whole of the wing-feathers of hens intended for the breeding-pen. If you do, poor fertility will probably result.

Long sharp spurs on the male bird are a drawback where fertility is desired. These should be pared and made blunt or cut off altogether.

During the early breeding season it is necessary to have a dry place in the breeding-pen if a high percentage of fertile eggs is to be secured.

LUCERNE ON SAND FOR POULTRY- FEEDING.

Profiting from experiments being carried out by the Fields Division of the Department of Agriculture in reclamation of sand areas, and following the advice published from time to time, Mr. J. Salkeld, of Burwood, Christchurch, was induced to try lucerne-growing on sand for poultry-feeding. The area on which he sowed the lucerne was pure sand, and was dressed with fowl-manure before being sown, on 12th July, 1912. Since then Mr. Salkeld has taken five cuttings off the crop—the first at the beginning of October, the second at the end of November last, the third early in January, 1913, the fourth in February, and the fifth in March.

THE DEPARTMENT'S STOCK.

"From the Government poultry-farm at Milton," says the *Otago Daily Times*, in writing of the display of poultry in the Department's exhibit at the Dunedin Winter Show, "comes a splendid exhibit of poultry, comprising a number of splendidly grown specimens of the utilitarian varieties. Several gentlemen who are in a position to judge stated that the exhibit was the best of its kind they have seen, and one went so far as to state that it would equal anything to be seen in the Southern Hemisphere." All the birds in the exhibit were the progeny of the stock imported by the Department from Australia last year.



LUCERNE ON SAND.

The fact should never be forgotten that the heavy-layer cannot be overfed.

Poultry-keeping is one thing and poultry-farming another. A man who keeps a cow or two is never called a dairy-farmer, nor is a man who has a few sheep termed a sheep-farmer.

PASTURES AND CROPS.

MAY.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month:—

BAY OF ISLANDS.—The disastrous drought broke on the 25th April, when a fairly heavy downpour of rain caused every settler to rejoice. The total rainfall for April was 1·78 in., which fell on five days, the heaviest being on the 25th, when 1·12 in. fell. May has been more favoured, and rain fell on twelve days, the heaviest being on the 15th, when 0·73 in. fell. The total for the month up to the 27th amounted to 2·59 in. Unfortunately, the autumn was too far advanced, and with the belated rain came cold temperatures, which have militated against any satisfactory growth being made in the pastures. As predicted last month, stock have suffered very much from the cold and bitter westerly winds that prevailed for the greater part of May. Towards the end of the month there were a few congenial days, the sun shining and the wind ceasing. The few of the more progressive farmers of this district who go in for turnip-growing have found the salvation and value of their wisdom in doing so, and have proved to their less progressive neighbours that it pays handsomely to cater for their stock in this way during the autumn and winter months. As a result of the drought a lot of the grasses have died, and weeds are growing luxuriantly in their place. It would pay many farmers, where it is possible to cultivate, to plough up such pastures and sow them anew. This would serve a twofold purpose, by preventing the propagation of weeds and improving the condition of the soil and pastures.—*W. J. Dunlop.*

WHANGAREI.—The weather for May was windy, with cold showers. On the night of the 10th this part of the country had one of the most severe gales yet experienced, and it was accompanied by a very heavy rainfall. The stormy weather continued until about the 20th. There has been little growth in the pastures, and consequently there is every prospect of this winter proving a very severe one on stock. Most of the turnip crops are failures, and there will be little feed to carry stock through to the spring.—*A. P. Speedy.*

AUCKLAND.—May opened with very unfavourable weather—southerly winds, strong to a gale, prevailed, and were followed by cold showery weather. Although there was plenty of moisture in the soil, there was not sufficient heat to encourage the growth of grass: consequently the pastures are bare. It is regrettable that very few farmers have made provision for winter and spring feed. Some who are fortunate enough to have an ample supply of feed have nothing to fear, but those who have not will find it difficult to obtain fodder without having to pay dearly for it. Turnip crops are much better than last year, and are now being fed off. Preparation of land for the early planting of potatoes is in progress, particularly in the Bombay district, and there is every indication that the area under this crop will be greatly increased this year.—*R. Rowan.*

OPOTIKI.—During May there were a few light rains, which were followed by severe frosts; consequently feed throughout the district is very scarce. It is feared that settlers have a hard winter before them. Maize-picking is now in full swing, and early planted crops are expected to yield as well as in past seasons.—*J. Case.*

TE AROHA.—The early part of May was dry. Sunny days were followed by severe frosty nights, which retarded all growth. The latter part of the month has been boisterous, with cold north-westerly squalls and very cold showers. In the Thames Valley pastures are very fair, but in other parts of the district feed is very scarce. Turnip and other root crops are good this season; and, with good crops of hay and oats harvested, settlers are fairly well prepared to meet the winter, which, from all appearances, is likely to be a severe one.—*J. R. Morris.*

HAMILTON.—The weather during May was wet, cold, and boisterous, with occasional frosts, which had a disastrous effect on the pastures. Feed is scarce throughout the district, and turnip crops are being fed off earlier than usual. Stock are still looking well, but owing to scarcity of feed in other districts large numbers of cattle and sheep have been brought into the Waikato, and the prospect of keeping them in good condition until spring is not good.—*J. Kerr.*

TE AWAMUTU.—The fine weather experienced during April was not continued this month. The weather for May was exceptionally stormy and wintry. Cold winds, rain, and frost predominated over occasional fine days. Winter has fairly set in, and stock are already feeling the pinch of bare paddocks. Turnips are good, but the area sown is small, and holders of large mobs of cattle are keenly competing for available supplies. The milking season, which was not up to expectations, is finished.—*C. E. McPhee.*

CAMBRIDGE.—The weather during May was very dry, with just odd showers. Hard frosts prevailed right throughout, and have retarded all growth. Pastures are bare but green. Turnip crops, on the whole, are good, but from present indications farmers will require all their straw and hay to see them through the winter.—*A. A. Clapcott.*

KING-COUNTRY.—May has been a typical winter month for this district, with cold rains and hard frosts. The latter were followed by days of clear sunshine. The rain freshened the pastures, but it promoted very little growth. Turnips sown on new fern land have not been a success, the fern having asserted itself. Swedes grown on well-cultivated old pasture country show the best results, though the size of the roots is below the average. Winter feed will be at a premium before the spring growth appears.—*B. Bayly.*

TAUPO.—The month of May was very dry, with a few showers at intervals. Cold southerly winds and a few frosts have retarded growth generally. Pastures are fairly bare, but green swede crops are, on the whole, looking well.—*H. Allen.*

TAIHAPE.—May was a very rough, cold month. Snow fell at intervals, and was accompanied almost immediately by severe frosts, which completely stopped growth in pastures. The farmers are already complaining, and are anticipating a very severe winter for all classes of stock. They say that they do not remember ever starting a winter before on so little feed. Turnips grown on Waikouru pumice plain are easily the pick of the district.—*A. P. Smith.*

MANGAWEKA.—Old settlers agree that May was one of the coldest months they have ever experienced in this district. Snow fell on several occasions, and was accompanied by a keen biting wind. The frosts, too, were exceptionally keen for so early in the year. Grass is showing signs of the severity of the weather, and stock have suffered a good deal from cold and exposure, and have gone back considerably, especially dairy cattle.—*J. A. Melrose.*

NEW PLYMOUTH.—May was a very cold month. There were several falls of snow on the mountain, and an unusual number of frosts. Rain fell frequently. All stock are looking well. The pastures, owing to the cold and frosts, are getting very short.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—May was a very variable and broken month, with strong southerly winds, very heavy rain, very sharp frosts, and towards the end of the month a few bright days. The rough weather and frosts stopped all growth of pastures, with the result that farmers have had to start on their winter feed sooner than they expected. As a lot of the turnips are diseased, the prospects for wintering stock are not too bright, except for those who are well prepared for it. There are several turnip crops affected with club-root. Already there is a demand for turnips, hay, and grazing.—*A. F. Wilson.*

WANGANUI.—The weather during May was infinite in variety, but generally unsatisfactory from the farmer's view-point. Storms of exceptional fury raged on the 1st, 2nd, 9th, and 20th, the last-mentioned being accompanied by thunder and a deluge of hail which spread a snowlike covering over the countryside. Conditions during the last two months having been inimical to the usual growth of grass, pastures generally are comparatively bare, and the outlook for stockowners who are dependent on natural feed is not encouraging.—*C. Watson.*

FEILDING.—The weather up to the 19th May was cold and wintry, with snow and sleet on the high country. Since that date fine weather with light frosts has been welcomed for working the land and sowing autumn crops; also for lifting potatoes, which have turned out very satisfactorily. From 15 tons to over 20 tons per acre have

been mentioned, principally of the Northern Star variety, which has become famous in this district, as it is grown practically free from blight.—*W. Dibble.*

GISBORNE.—The weather during May was cold and boisterous, with a good deal of frost for this district. Feed for sheep is fair, but for cattle scanty. The rainfall was light.—*W. Ross.*

WAIROA.—The weather-conditions of May were of a seasonable character. Fine sunny days accompanied by frosty nights, and alternating with occasional broken periods of a wintry nature, were experienced. Pastures still continue to make moderate headway, and stock are in fair condition. Turnip crops are being generally regarded as a failure, and farmers will require to derive all the benefit from nature's unassisted growth to maintain their own.—*T. F. Mullaly.*

WAIKURAU.—The month of May was a very wintry one; high rains fell, and there are heavy coatings of snow on the Ruahines. The lower levels experienced heavy frosts throughout the month, and the growth of pastures has consequently been retarded.—*H. O. M. Christie.*

HASTINGS.—The weather during May was seasonable. There were cold nights and several severe frosts. Less rain fell than is usually recorded at this time of the year. Consequently stock are looking exceedingly well, considering the scarcity of feed.—*J. G. Parker.*

PAHIATUA.—Winter set in in real earnest from the commencement of May up to about the last week, when frosts came, with fogs for three mornings. The fogs helped to prevent the frost from cutting down the pastures. The soil is in good condition for the plough, and it will now pay to turn the land and work it well. Farmers will now have to begin to feed their stock. During the month rain fell in Pahiatua on fifteen days, as against ten days for the same period last year. The total fall during the month was 6.11 in.—*T. Bacon.*

NORTH WAIRARAPA.—Rough weather was experienced throughout the district during May. This will tend to make feed scarce, and to raise the price of fat and forward stock. Turnips are not standing much feeding off. The majority of the butter and cheese factories will be closing down about the middle of June. There have been more cows milked in the Wairarapa this year than formerly. This will help to make cow-feed very scarce about spring. There is still a fair amount of crutching to be done on the stations. Farm-work is at a standstill, the ground being too wet to plough. Those who have winter feed should reap the benefit.—*J. S. Rankin.*

MASTERTON.—The weather during May was exceptionally wet and cold, and has seriously interfered with farming operations. Ploughing in particular has been thrown back, but, fortunately, a considerable amount of ploughing was done last month, and in isolated cases early oats were sown. It is very noticeable that the autumn-sown crops usually turn out much better than the spring crops. Weak sheep are feeling the rigorous weather which has been experienced in this district, and it is reported that a number have already succumbed. Snow fell on the low-lying country on the 22nd, but remained only a short time. Pastures have suffered with the early approach of winter, but so far there appears to be ample feed to see the winter through. Fortunately, there was a large quantity of real good hay saved this season.—*T. C. Webb.*

CARTERTON.—The weather during the month of May was very unsettled, and on the high country snow was very much in evidence. Several heavy frosts were experienced. The milk-yield has decreased considerably, and all factories will shortly be closing. Stock in general are looking well. Many farmers are having trouble in obtaining grazing for their dairy herds. Autumn-sown crops are looking well.—*S. C. Ivens.*

WELLINGTON.—Winter made its appearance in earnest with the incoming of May. The continued cold southerlies, with heavy rain, during the first ten days were followed by keen frosts, which cut back the growth of pastures severely. As a result, feed will now be scarce on exposed lands. Crops of swedes were very fair, and mangels were good generally. Autumn-sown oats were looking well. The weather was too wet for potatoes; altogether it has been a poor year for this crop. Milking-herds suffered a good deal, but other classes of stock were looking fairly well.—*G. H. Jenkinson.*

BLenheim.—Winter set in unusually early, and there is every promise of it proving a severe one for stock. With few exceptions there was frost every night during May, the hardest being about 12 degrees. On the 9th and 10th of the month cold rain set in, and on the high levels the snow was very heavy. Even the lower hills round Blenheim had a fairly thick covering, which came unusually low down. The days were beautifully bright and sunny, if somewhat cold.—*F. H. Brittain.*

NELSON.—The weather for May was very cold, with snow on the hills and frosts at night. Though only a little over 2 in. of rain fell, there were two falls of snow. It is many years since there was so much snow in May. The country is still dry, and the rivers and creeks are very low. The ground has been so dry that it has been difficult to plough anything but stubble land. Owing to the weather being so cold and the ground so dry, there has been little growth in the grain crops. The pastures are poor, and feed is getting scarce. There is every prospect of a very severe winter for stock.—*Gilbert Ward.*

WESTLAND.—The weather-conditions throughout May were of a very boisterous nature, and considerable damage was done in the Inangahua and Murchison districts owing to heavy falls of snow. Settlers who had sheep depasturing on the high country seem to think that their losses will be somewhat heavy in consequence. As they did not expect such severe weather so early in the season they had no opportunity of removing stock. Dairy stock have also suffered considerably.—*H. J. Walton.*

SEDDON.—Up to the 15th May there were heavy rains combined with snow falling heavily, especially through the Upper Awatere. After this severe frosts started, being followed by bright sunny days, which prevailed to the end of the month, when heavy rain set in. All farming operations had practically to be suspended during the early part of the month, as the ground was too sodden from the recent rains for suitable working. There is promise of a plentiful supply of feed during the coming winter.—*E. T. Sinclair.*

KAIKOURA.—Extremely cold weather prevailed for the first half of the month of May, and heavy falls of snow on the Kaikoura Mountains made access to the Clarence Valley a difficult undertaking. The latter half of the month was fairly dry and seasonable. Pastures and crops have made very little growth, owing to cold weather and frosts.—*W. S. Goodall.*

ROTHERHAM.—The weather during May was of a very wintry character, and there was every indication of an early winter. During the first week there was a heavy rainfall with severe snow in the back country, a fall of 3 ft. being reported in the Clarence country. It was also very severe in Tarndale and Molesworth districts, where there was still snow to a depth of 2 ft. at the end of the month. Gangs of musterers have been snowed up since the first week of May. Towards the end of the month severe frosts set in, and there is every indication of the snow remaining for the winter. This would prove disastrous to stock, which cannot be got on to the winter country. Potato-digging has been in full swing, but the returns have been very poor.—*W. M. Munro.*

RANGIORA.—There were a few wet days in the early part of May, but the remainder of the month was very fine. Farmers were busy ploughing and lifting potatoes and mangels. Two or three paddocks of mangels appeared not to be quite ripe, owing probably to late sowing and early frosts. A large number of farmers have pitted their potatoes, expecting prices to improve. The crops are heavier than was anticipated, but there are more small ones than usual. There were several severe frosts during the month, and the hills have been covered with snow for some time.—*A. Hughes.*

LINCOLN.—May commenced wet and cold, and continued so with little change for sixteen days. As a consequence, farm-work was brought almost to a standstill. During the remainder of the month, when the weather was fine but cold, teams were kept hard at work. Growers have been busy drilling winter wheat, of which a considerable acreage still remains to be sown. The greater part of the potato crops are now dug, and are coming out of the ground in a generally sound condition. The early setting-in of winter this year has emphasized the importance of providing plenty of winter feed for stock. Happily, in most cases due provision has been made in this respect.—*J. G. Scott.*

ASHBURTON.—Rain fell on twelve days during May, and the total measurement was 4.18 in., against 0.86 in. for the corresponding period of last year. An unusually early fall of snow occurred at the commencement of the month in the back country, and from information received there is likely to be a heavy mortality on runs at the head of the Rakaia Gorge, as the owners were just starting to muster for the winter to put their sheep on the safe country. For the best part of the month beautiful sunshine, with frost occurring for twenty-three nights, has been experienced, and farmers have been busy getting in their winter wheat. A very large number of breeding-ewes have been brought into the district during the month, and up to £1 3s. has been given for fat lambs. Now that the leaves have been eaten off the turnips, some very fine crops are to be seen. Potato-lifting is now in progress, but the crops are only medium, with comparatively no blight.—*C. Branigan.*

FAIRLIE.—There was a very heavy fall of snow in the north end of the Mackenzie country in the beginning of May. After this, mild weather was experienced, with strong north-westers in the back country. On the low levels all stock is doing well, and there is no scarcity of feed.—*W. B. Manning.*

TIMARU.—The early part of May was wet, with a lot of cold weather and a light fall of snow on the downs. The latter part of the month was warm and foggy. Good headway has been made with the sowing of winter wheat. Threshing cow-grass seed is general, and some good yields have been reported.—*J. C. Huddleston.*

WAIMATE.—The weather during the month of May was very changeable and excessively cold, with periodical frosts. Several snowstorms were experienced on the high country. Farmers are busy with the sowing of cereals. There is a considerable demand for wheat known as Red Marvel, grown so successfully last season on the co-operative experimental area in this district. Pastures look well, and there is ample feed in evidence to carry stock over the winter months. Stock in general are looking well. Some very fine crops of swedes are to be seen throughout the district, but on some of the low-lying lands turnips have suffered considerably owing to too much moisture. Maize and lucerne have been much hindered in growth by frost and cold winds. Farmers are becoming interested in silver-beet growing, and there may be a good demand for this frost-resisting plant.—*F. A. Macdonald.*

KUROW.—May was a good month for the farmer, and the frosts did not interfere with ploughing operations. Consequently, at the end of the month horse-work on the farm was well forward. During the earlier part of the month there was a fairly heavy fall of snow on the high country, but it was followed by mild weather, and the snow melted. Potato-digging was still going on, but the crops were not turning out very well. Pastures were still good, but there was a very limited supply of turnips and mangels in this district. Sheep mustered off the high country during the month came in in good condition.—*G. Reid.*

OAMARU.—May was a fair month for the farmer, and ploughing has been in full swing. There was a cold snap in the middle of the month, and much snow fell on the high country. Potato-digging has been carried on, but light crops have been experienced. The month closed with cold southerly gales and stormy weather.—*W. F. Flower.*

PALMERSTON (SOUTH).—The weather was exceptionally rough, and temperatures were unusually low during the greater part of May. The rainfall since the 28th April was 263 points, of which 93 fell on the 30th May. There is a heavy coating of snow on the Kakanu Ranges. A keen frost was experienced on the night of the 9th, and was followed by rain and gales. The barometer registered lowest on the 19th. It has been a severe month on stock.—*C. S. Dalgliesh.*

DUNEDIN.—The weather during May was rough and stormy, and exceptionally cold. In fact, many old residents maintain that it has been the roughest May experienced in Otago since 1878. All farm-work is at a standstill. In several cases the potatoes are still in the ground, and there seems little chance of lifting them before spring comes in. The dairy-farmers are feeding heavily on green feed and roots, as there is not much feed left on the pastures.—*J. R. Renton.*

STRATH TAIERI.—The weather during May was unusually wintry, and it is many years since such weather was experienced at this time of the year. Pastures are becoming bare, but on hill country there is a fair growth. Turnip crops generally are light.—*W. Scott.*

CLYDE.—The weather for the month of May was squally. A good deal of rain fell, and there were some heavy falls of snow on the high levels. As there has been very little frost, the recent rains have brought the pastures along fairly well. It looks as if the farmer will have a fair amount of winter feed, instead of having none, as it looked like a few months ago.—*T. N. Baxter.*

MANIOTOTO.—During the first ten days of May the weather was very unsettled. Cold winds, accompanied by snow and sleet, were experienced. The latter part of the month was fairly fine. There was a good deal of frost during the month, especially after the 22nd. The high country has been slightly covered with snow. Stock are in good heart, and the district is looking well.—*A. T. N. Simpson.*

LAWRENCE.—The weather for May was very cold and wet. There was a little snow and few nights of frost. Owing to so much rain farming operations are backward, and stock are not doing very well on turnips. There are a few isolated cases of the oat crop still remaining to be stacked. If rough and wet weather continues there is a possibility of a shortage of feed for stock before the spring.—*R. Barron.*

GORE.—The weather during May was very bad, and, with the exception of an odd day, has been continually wet and cold. Consequently, farm-work has been almost at a standstill. In one or two places there is still some grain in the stook, and this will now be difficult to save. Farmers of long standing say that the weather during the past month was the worst they have experienced for a great many years. Turnips have done well, but the continuous rain has made it very bad for feeding off.—*B. Grant.*

OWAKA.—The weather during May was of a wintry nature. Cold stormy weather set in on the 1st, and continued up to the 23rd. The higher parts of the district received several coats of snow, while cold rain-showers were experienced on the low levels. The roads have been in a bad state owing to the wet weather experienced. Feed is plentiful, and the outlook for winter is satisfactory.—*R. McGillivray.*

LUMSDEN.—May, our first winter month, was certainly seasonable. Altogether, there was not a week's good weather throughout the month. Much snow fell on the back country, while biting winds accompanied by hail and sleet were general in the district. Oats are still to be seen uncut and in stook. The potato crops are turning out better than was expected. The turnip crops will not stand the feeding-off that they first gave promise of.—*W. S. S. Cantrell.*

INVERCARGILL.—There was very little sunshine during May, and the weather was cold and wet. Farm-work has been retarded on account of the land being too wet to work. Very little frost has been experienced so far. Grass is scarce, and turnips are being fed off. The rainfall for the month was 7.85 in.—*J. S. Whyborn.*

OTAUTAU.—The weather for May was wet and cold. On the 21st a good deal of snow fell on the ranges, and a little on the flat country as well. Very slow progress has been made with the ploughing, and unless a change comes soon there are indications of another late harvest. A good deal of the present harvest is still out, and there is no sign of ever getting it in. A few oats have been sown. Potato-digging is in progress, but slow headway is being made owing to the wet weather. The yield is far below the usual, many crops not going more than about 6 tons to the acre, and there is a good deal of blight in some.—*H. F. Dencker.*

QUEENSTOWN.—For the month of May there was exceptionally wintry weather; snow fell on the high country, and continuous rains on the low levels, during the whole period. A few nights' hard frost have had the effect of cutting the pastures back somewhat. Some crops are still out on the Crown Terrace, but, generally speaking, the farmers have saved their crops fairly well.—*A. Clarke.*

PEMBROKE.—The weather during this month has been exceptionally severe, and it is several years since the snowfall on the high country in May was as heavy as it has been this year. Several runholders who had not mustered were compelled to snow-rake to secure their sheep. However, no serious losses have been reported. Feed is plentiful, and with a favourable winter farmers and pastoralists should have a satisfactory season.—*J. A. Griffith.*

SOUTH AMERICAN TRADE.

THE steamer "Ionic," which sailed from Wellington to London on the 15th ultimo, had on board the following cargo for South American ports: For Monte Video: From Hobart—8,150 cases apples; from Melbourne—22 cases fruit-trees; from Hastings—432 cases apples; from Nelson—2,198 cases apples, 460 cases preserves, and 4 bales hops. For Rio de Janeiro: From Hobart—7,050 cases apples, 200 sacks potatoes; from Nelson—500 cases apples; from Dunedin—500 sacks potatoes, 50 cases onions; from Lyttelton—200 sacks potatoes.

The steamer "Opawa," which sailed from Wellington for London on the 13th ultimo, had on board a transhipment of 8,875 cases of apples from Hobart for Monte Video.

The steamer "Ruapehu," which sailed from Wellington for London on the 29th ultimo, had on board the following cargo for Monte Video: 2,005 cases apples from Nelson, 840 cases apples from Wellington, and 320 sacks oats from Lyttelton.

The steamer "Pakeha," which sailed from Auckland for London on the 14th ultimo, had on board 9,450 cases apples for Monte Video, and 5,694 cases apples, 19 cases pears, 200 sacks potatoes, and 200 sacks oats for Rio de Janeiro. The above items, with the exception of the oats, which were shipped at Christchurch, were transhipments from Australia per s.s. "Ionic."

THE FRUIT CROP.

THE officers of the Orchards, Gardens, and Apiaries Division report as follows on the condition of the fruit crop at the end of May :—

WHANGAREI.—Apples nearly finished. Lemons, crop medium to fair. Pears, crop finished. Oranges promise a fair crop. Loquats showing well. Pruning of stone-fruit is proceeding.—*J. W. Collard.*

AUCKLAND (NORTH).—Apples, fair crop of late varieties. Lemons, crop looking well. Pears, crop nearly finished.—*W. C. Thompson.*

AUCKLAND (SOUTH).—Apples, crop all picked, small quantity late stored. Pears, crop finished. Strawberries, runners looking well, large quantity being planted this year. Tomatoes practically all done; several heavy frosts.—*N. R. Pierce.*

HAMILTON.—Apples all harvested; fair supply, realizing good prices. Lemons still very scarce. Pears all picked. Tomatoes, crop finished. Walnuts, crops all picked; crops light but of fair quality. The pruning and spraying of peach-trees has just commenced.—*T. E. Rodda.*

POVERTY BAY.—Apples, poor prospects for the winter; ravages by codlin-moth and dry season greatly affected the crop. Lemons poor. Pears, prospects not bright for winter; late varieties ripened off too early. Walnuts, good average crop.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, fairly good crop of late varieties; nearly all apples now picked; very good prices obtained. Pears, good crop late varieties, free from "black-spct." Tomatoes, season over; most growers had good crops. Walnuts all gathered.—*G. Stratford.*

WANGANUI.—Apples, trees in excellent condition, as also are apricot, cherry, gooseberry, and lemon trees. Nectarines, trees never looked better at this season; pruning has commenced. Pears, some big crops are being harvested and quitted at good prices. Plums, trees in fair condition. Raspberries, canes fair to poor. Strawberries, plantations generally good, many being remarkably free from spot. Tomatoes, crop over. Walnuts, condition fair; not much grown.—*W. C. Hyde.*

HASTINGS.—Apples, supplies running short, prices good. A start has been made with the pruning and spraying of nectarine and peach trees; in many cases considerable damage has been done to the fruiting-wood by rust and dieback. Pears, scarcely any other than cool-store fruit available. Walnuts, season over, running short, prices good.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop, growers storing considerably. Pears, average to heavy crop, supply has shortened. Tomatoes, average crop; early frosts have almost finished the remainder.—*T. C. Webb.*

BLLENHEIM.—Apples, main crop nearly harvested, and pruning just commencing. Lemons, still gathering a few. Peaches, pruning of trees just commencing; very poor growth owing to leaf-curl earlier in the season. Pears, all varieties harvested; a few commencing to prune. Walnuts, heavy crop, nearly all harvested.—*B. G. Goodwin.*

NELSON.—Apples, picking now completed; good quantity of fruit still on hand, much of which is second quality, chiefly owing to black-spot; shipments for the month to South America total 4,866 cases. Large quantities of young trees have already been landed for the season's planting; they are a splendid lot, well grown, clean, and healthy. Pears, picking now finished, only limited supplies on hand. Strawberries, growers are busy putting their plots in order, and extending their areas for the coming season.—*J. H. Thorp.*

CHRISTCHURCH.—Apples nearly all harvested; a good quantity has been placed in cool stores; a shipment of apples is leaving Lyttelton for South America by the s.s. "Athenic" on the 4th June. Pears all harvested; turned out well, and fair quantity placed in cool store. Tomatoes, crop over; good crop harvested.—*W. J. Courtier.*

TIMARU.—Apples, all varieties harvested. Pears, all varieties gathered; good crops of Winter Cole variety. Raspberries, canes are now being trimmed in some districts. Strawberries, plants have made good supplies of runners. Walnuts, fine samples of local walnuts now being offered.—*A. B. Mansfield.*

DUNEDIN.—Crops of all varieties of fruit harvested now. Pruning and other winter work in full swing.—*W. T. Goodwin.*

HONEY - CROP PROSPECTS.

THE Director of Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—From the latest reports received it seems that some beekeepers have overestimated their honey-yields, but notwithstanding this the average yields for the Auckland districts have been good. Prices have an upward tendency, and most of the producers have now placed their surplus honey at prices from 10s. 6d. to 11s. 6d. per dozen for 2 lb. tins, and from 1s. to 1s. 2d. each for 2 lb. glass jars. Some of the beekeepers have had further inquiries for more honey, but have not been able to supply. Requests for section honey have also been received here from Dunedin merchants, offering from 6s. 6d. to 7s. 6d. per dozen for 1 lb. sections; but owing to the poor prices obtained in the past for this class of honey there is very little on the market. The quality of the honey this year has been very good, and only a small percentage of inferior grades have been obtained. Beeswax is bringing higher prices this year, 1s. 5d. to 1s. 6d. per pound being offered.—*G. V. Westbrooke.*

WELLINGTON.—The prices ruling last month have not changed up to date—viz., 4d. per pound and over for bulk. Wholesale price of 2 lb. tins, 10s. to 11s. per dozen; 2 lb. glass jars, 13s. to 14s. per dozen. Most of the produce is being sold in bulk lots, and a shipment is now being graded in Taranaki for the Home market. This will have a tendency to harden prices. Beeswax is realizing 1s. 6d. per pound.—*F. A. Jacobsen.*

CHRISTCHURCH.—There is a steady retail trade doing, prices for sections and extracted honey being the same as last month. An advance in retail prices is anticipated very soon. Beekeepers have a fair stock on hand, and do not seem too keen to sell. No doubt the export of honey recently will materially help in maintaining a fair price. A cable offering 4d. in bulk for honey exported and Government-graded has been received, but not accepted, the producer anticipating a better price when the honey is landed. The first consignment of 10 tons left on the 1st May. The second consignment of 8½ tons left on the 29th May. The third consignment is coming to hand to be graded.—*L. Bowman.*

DUNEDIN.—There is practically no alteration in the local honey-market. Bulk honey is in good demand. The first consignments of pat honey opened up well, and lots brought at auction 5½d. to 6½d. per pound. Good sections are still in request at 7s. per dozen.—*E. A. Earp.*

Beds of carrots, parsnips, and beet-root, on light land at Ruakura Farm of Instruction, grown for winter use resulted in failure, owing to the grass-grub. On heavier soil the grub was absent, and good crops of these vegetables resulted.

In order to encourage the production of wool in Canada the Dominion Department of Agriculture has appointed a sheep specialist and two expert wool-sorters (who will take charge of the sorting of wool at shearing-sheds), while for the current year it will pay 25 per cent. of the freight charges on wool from port of shipment to the London market.

THE WEATHER FOR MAY.

D. C. BATES.

THE barometer was below the average during the greater part of the month, and the exceedingly low reading of 28.48 in. was recorded on the 19th at the Bluff, being only one-hundredth above the record for New Zealand. The readings from Adelie Land and Macquarie Island were not so low, and the whole disturbance bore the character of a vast cyclone in high latitudes. Anticyclonic conditions with fair weather ruled at the close of the month.

Strong southerly winds were prevalent with cold and boisterous weather, except in the Bay of Plenty and Nelson districts, which are somewhat sheltered from these winds.

The total rainfall during the month was not excessive, except in the southern portion of the North Island and parts of the east coast and southern districts of the South Island.

District.

Chiefly from Telegraphic Reports.

- 1, 2, 3. The month was cold and showery, with stormy conditions ruling during the first half, but no particularly heavy rainfalls were recorded, the total being about 35 per cent. below the average in districts Nos. 1 and 3, but only slightly under the average in No. 2.
4. Cold southerly winds predominated, attaining gale force on numerous occasions during the first three weeks. A severe thunderstorm was experienced at many places on the 10th, accompanied by a heavy fall of hail, the latter in some cases being reported as large as peas. Some stations also had extremely heavy rainfalls on the 19th and 20th. The aggregate, however, was usually about 30 per cent. lower than the mean May fall.
5. Rainfall was less than the average by from 40 to 60 per cent. Cloudy weather was frequent, with occasional showers, but conditions were not generally so unfavourable as in those districts more exposed to the southerly winds which prevailed during the month.
6. During the greater portion of the month cold and showery, and at times boisterous, weather prevailed. Snow fell frequently on the high land. The last week was more favourable, although cold with frosty nights. About 35 per cent. less than the average rain was recorded.
- 7, 8. Rainfall was considerably below the average in both these districts, being chiefly of a showery nature. Fair weather predominated, especially in the latter portion of the month. Some hard frosts were experienced during the last week.
- 9, 10. During the first half of the month weather-conditions were extremely boisterous, high winds and heavy rains being frequent. The heaviest rain generally occurred on the 1st, when some stations, especially in the extreme south of the North Island, recorded extraordinary falls. At Wellington on this day the total for the twenty-four hours was 5.70 in., but this was exceeded at Wainuiomata, where 9.93 in. were recorded in nineteen hours. At the latter station this was the amount actually measured, but the total should be more than this, the rain-gauge having become flooded afterwards.



District.

- 11, 12. Cold and showery weather prevailed, with the exception of a few short periods of clear conditions. Snow fell on the higher levels on the 10th and 21st, and electrical disturbances occurred at many places on the 20th and 21st. Precipitation was everywhere below the average, the deficiency ranging between 20 and 50 per cent.
- 13.
14. The weather was cold though usually fine, and frosts were almost of daily occurrence. Fifty per cent. below the normal rain was recorded.
15. The rainfall was below the average, the difference varying considerably. Several short periods of fair weather were experienced, but cold and showery conditions prevailed, with snow at times.
- 16, 17. About the average rain fell, in some cases slightly above. Dull and cold weather predominated, and snow fell on the 10th at many places.
18. From the beginning to the 20th of the month very boisterous conditions were the rule, with cold and at times high southerly winds. On the 1st and 10th very heavy rain fell, causing an excess of the average at most stations in the total for the month. Snow fell on the hilly country on the 1st, 10th, and 11th. Frosts were frequent.
19. Cold and boisterous weather prevailed in the first half of the month, and much rain fell during this period. In the latter half more-favourable conditions were experienced, but temperatures were usually below the mean, and frosts were numerous. The rainfall was double the average in some cases.
20. About 30 per cent. above the average rainfall was recorded, most of it falling during the first eleven days. Fair to cloudy and cold weather prevailed for the remainder of the month, and some hard frosts were experienced.
- 21, 22. Rainfall slightly in excess of the average. Weather similar to district No. 20.
23. The beginning of the month was stormy, and unsettled conditions continued until about the 15th, after which conditions improved. Snow fell inland on the 1st. The aggregate rainfall was below the average by about 15 per cent.
- 24, 25. The month was characterized by very cold and wet weather throughout, no particularly heavy rainfalls occurring, but the number of wet days was excessive.

RETURNS FROM FRUITGROWING.

FROM 30 acres of orchard in the Croydon district, Victoria, 7,000 bushels were gathered; and, estimating at 3s. per bushel, which is conservative, this orchard would show a return of £1,050, or equivalent to £35 per acre. However, the fruit from the orchard realized much better prices, 10s. per bushel being obtained for plums of the Grand Duke variety in the Sydney markets. This is a splendid plum, will keep well in cool storage, and stands shipping. Gravenstein apples averaged 8s. 6d. per bushel; whilst those of the Jonathan variety, after being taken from the cool stores, sold at from 9s. to 10s. per bushel. This orchard is well cared for, and the trees receive about 3 lb. of sulphate of potash in the spring.

From 10 acres of well-cultivated orchard in the same State the grower took £1,150, and from the same trees the following year £750.

From 1 acre of gooseberry-bushes the grower harvested 6 tons of berries. He sold his crop to a jam-factory at the remunerative prices of £18 to £22 per ton. This profitable acre returned £120 to the grower.—*A. Bailey Mansfield.*

ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the *Journal* in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question, the most complete descriptive details should be furnished.

BEEKEEPING.

MR. LEONARD LORD, Napier:—

I have read several of the articles in your *Journal* on beekeeping, and I wish to make a start in a small way. Could you advise me where I could get a colony? I should like leather-coloured Italian. Kindly also advise me if there is a good book to be had on the subject.

The Orchards, Gardens, and Apiaries Division replies,—

Strong healthy colonies of bees are procurable from the Government Experimental Farm at Waerenga, in the Waikato. A price-list containing conditions of sale, &c., has been posted you, also copy of Bee Bulletin No. 18, which contains valuable information, especially for beginners in beekeeping.

ERADICATION OF WEEDS.

MR. D. C. D. THOMAS:—

Could you inform me, through your *Journal*, how to kill dandelions and other weeds in lawns without taking the lawns up? I understand that there is some mixture that can be made which will do this, without hurting the grass or clover at all.

The Orchards, Gardens, and Apiaries Division replies,—

One of the best means of killing weeds in a lawn is by sulphuric acid. As only a few drops are required for each weed, a good way of applying it is by using a large nail, which is dipped in the acid and applied to the centre of each weed. Care should be taken to see that the hands or face do not come in contact with this acid, as it will inflict severe burns. Sheep-dip undiluted applied with an old brush to the crown of each weed is also a good eradicator.

ONIONS.

"GROWER," Taihape:—

As I am contemplating planting a few acres with onions, I should be grateful to you for the following information:—

1. The best and most profitable seed to sow, and average yield per acre from same.
2. Is this district a good one for growing onions (soil, rich brown)? If so, the time to plant, quantity of seed per acre, and best fertilizer to use.
3. Does frost and snow affect growth? If so, method of protecting plants from same.

The Director of Fields and Experimental Farms Division replies,—

The best onion-seed is Australian. This seed can be obtained from New Zealand seedsmen. The yield of onions per acre might be anything between $2\frac{1}{2}$ tons and 15 tons; 10 tons is a very good average on moderately good soil. I

have no personal knowledge of the soil and climate of Taihape, but I understand it is very cold, with a late spring. If this be the case it cannot be considered an ideal place for growing onions. I know of no practicable way to protect the crops from snow and frost. It would be useless to sow until snow and hard frost is past, as a few degrees of frost would nip the tops and check growth. In the Manawatu district many people do not sow until middle of September, and succeed in ripening crops. Late sowing is not desirable, as there is additional risk from mildew. Sow Australian Brown Globe or Brown Spanish. These varieties mature well, as a rule. Sow as early as you think safe, having in mind the above remarks *re* frost and snow. Thin quickly and cultivate well to encourage rapid growth. Soot and wood-ashes are excellent fertilizers; so are superphosphate and bonemeal—two of superphosphate to one of bonemeal—3 cwt. per acre. To hurry growth, give 1 cwt. nitrate of soda immediately after thinning. Apply the other fertilizers two or three weeks before sowing. The soil should be prepared some weeks before sowing. If the land is in grass it should be ploughed in autumn, and well worked to break down the sods. It is necessary to secure a firm and even seed-bed by means of a levelling-drag and roller, or the drag only will answer both purposes if heavy enough. A rough slab of timber that one horse can pull makes a good drag. This implement will level small hollows and crush lumps. It is usual to sow the fertilizers at the same time as the seed, but I think that in the case of onions it should be broadcasted separately, in advance of the sowing. Three pounds of seed is sufficient for an acre. This Department is this season testing a new variety of onion, which is said to mature quickly. If this characteristic is proven, it will be a boon to growers in such places as Taihape, where the season is short.

CALIFORNIAN THISTLE.

MR. D. R. BARRON, Arrowtown :—

I should be glad if you would kindly answer the following question for me through the columns of your *Journal*: If horses are fed on oaten chaff which contains Californian thistle, is there any likelihood of the seed germinating after it has passed through the animals?

The Fields and Experimental Farms Division replies,—

Numerous instances have been recorded of thistle-seeds germinating after being eaten by stock, and there appears to be a likelihood of Californian thistle being spread in this way.

SWEDE-TURNIP ROT.

MR. ARTHUR E. PEARCE, Konini, Waituna West :—

Can you give any information regarding the cause of swede-turnip rot? I have a crop affected with it this season, and should like to know if there are any preventive measures that may be taken. Are any of the varieties of swede proof against the disease? Is the trouble more prevalent on land that has produced a succession of root crops?

The Biologist replies,—

Swede-turnip rot, which is a bacterial trouble, cannot be controlled in any practical manner. In districts that are liable to the disease great care should be used in selecting land that has not grown a root crop for some years. There are several distinct swede rots, and I would be obliged if some specimens were sent me.

TURNIP-DISEASE.

“DARWINIAN,” Karamea :—

By this mail I am sending you one swede, also 5 lb. of soil for analysis. All my swedes are the same, with dark, hard centres, which renders them unsuitable for table use. The soil I am sending is a sample of the ground in which they were grown. It

has been properly cultivated, with top-dressing of 1 cwt. basic slag and 1 cwt. of rock superphosphate, well mixed together, to the acre. The crop is the best I have ever grown, equalling 60 tons to the acre. Kindly advise me at your earliest opportunity, through the columns of your *Journal*, what is the cause of the dark, hard centres in the swedes, and how it is to be remedied. Would lime do as a fertilizer for mangels in ground from which sample has been taken? If so, please state what kind and quantity of lime to use.

The Biologist replies,—

The presence of clear hard spots in the interior of swedes, which is by no means a common complaint, appears to be similar to the diseased appearance occurring in apples under the name of "glassy core." There is, however, no evidence that the trouble is due to any specific organism. The analysis of the soil may reveal the cause of the disease, as it is supposed to be a physiological one, and caused by the character of the soil in which the crop has been grown. The soil was sent to the Agricultural Chemist, who has forwarded you a copy of his Annual Report for 1908, on page 258 of which is an article dealing with this subject. He adds that liming these lands is recommended for internal brown-spot of turnips.

SILVER-BEET.

MESSRS. JONES BROS., Paengaroa, Bay of Plenty :—

Having seen an article on silver-beet in the April number of the *Journal*, we would like to know if the Department can furnish us with more particulars as to the growing and feeding-off of this plant, or any other information bearing on the subject.

An article on silver-beet, covering the information you desire, appears in this issue of the *Journal*.—ED.

CABBAGE-APHIS.

MR. H. HUMPHREY, Silverhope :—

I am troubled very much with blighty cabbage in summer and autumn. Can you suggest a remedy for this?

The Director of Orchards, Gardens, and Apiaries Division replies,—

The cabbages are evidently attacked by cabbage-aphis. Spray with a tobacco-wash in the following proportions: 1 lb. strong tobacco or 3 lb. waste tobacco, 3 lb. soft-soap, 20 gallons water. If cabbages are young use about twice as much water as that given in above formula, if necessary gradually increasing the strength of the wash as the season advances and the growth hardens. Another good spray for the control of aphis is one cake of sunlight soap boiled in 3 gallons of water, and applied with a fine spray. Care being taken to see that the under-sides of the leaves are covered with the fluid.

SHEEP TROUBLES.

F. G., Rangiwea, Ruanui :—

I would like your advice about some lambs of mine that are going blind. The most of them are Romney-Lincoln, a few of them being pure Romney. They were weaned and dipped on the 17th March, and were put into a clean paddock with good fresh feed in it. On the 30th March they were shifted into another good paddock. On the 18th May they were put into a small paddock of soft turnips. This is the first crop of turnips that has been taken off this paddock, as it has never been ploughed before. The other paddocks are all bush country. The day I put the lambs on the turnips I noticed two of them were blind. After they had been on for about three days I noticed a good many of them getting sore eyes. I left them on the turnips for five days, camping them in a grass-paddock for three nights. Yesterday I took out ten blind ones, and a good

many of the others seem to be going blind. There are six big sheep running with the lambs, and two of them are blind in one eye and seem to be going blind in the other eye. One is a fat Romney ewe, and the other a Corriedale. I am now turning the lot out into a grass-paddock again. Do you think it is likely to spread right through the flock? And what should I do to get the blind ones right again? Also, what is the best treatment for sheep with large warts between the toes? One thing I forgot to mention about my lambs: whilst they were on the turnips we had a light fall of snow, and two very hard frosts following the snowstorm. But my turnip-paddock is well sheltered by native bush.

The Director of the Live-stock and Meat Division replies,—

It is rather unusual to get cases of ophthalmia at this time of the year. My opinion is that some digestive disturbances are the cause; and from the account you give of the management of your flock I should attribute this to the action of the frost and snow on the turnips. Neither the frost nor the snow itself would cause it directly. You did quite right to put them back on to the grass-paddock. I should put them on the barest one you have got for a time, to give them a change. The condition is not contagious; the reason why so many are affected is that they all have been subjected to the same cause. It would be better to separate the blind ones, and put them in a paddock where they cannot fall into the ditches, gullies, &c. The eyes, as a rule, clear up by themselves when the animals are given a change. You can, however, treat them by dropping into the eyes a small quantity, twice daily, of a solution of sulphate of zinc. Get your chemist to make you up the following: zinc sulphate, 16 gr.; rose-water, 8 oz.

I do not know what you mean by large "warts" between the toes. Are the sheep lame, or have they foot-rot? I think the best plan would be to have the sheep examined, and I am asking Mr. Huddleston, Inspector of Stock, to call and see you.

POTATO-GROWING.

MR. R. BRADBURY, New North Road, Kingsland, Auckland:—

As a new hand at agriculture I am going to ask a little advice, so would you please give me a few hints on potato-growing? I have a couple of acres, and intend putting potatoes in for early spring. Would you tell me how much and what kind of manure is best per acre; what is the best way to apply it; what kind of potatoes are best for early market; and how many hundredweight of seed-potatoes per acre? If you will kindly answer these questions, with any hints that would be of value, I should be very much obliged. The soil is a light one, and is situated close to the water's edge, Auckland.

The Fields and Experimental Farms Division replies,—

Well-rotted farmyard manure is a good fertilizer where humus is deficient. If heavy amounts are not available, small amounts used in connection with artificial fertilizers will be found very beneficial. The following mixed fertilizer can be recommended per acre: 2 cwt. to 4 cwt. superphosphate, 1 cwt. to 2 cwt. sulphate of potash, and 1 cwt. to 1½ cwt. sulphate of ammonia. This should be applied before planting the potatoes. The following are good varieties for light soils: Early Vermont, American Early Rose, Henderson Improved Early Puritan, Robin Adair, and British Queen. 12 cwt. to 15 cwt. of cut sets per acre should be planted. Land should be deeply cultivated. Use clean and even-sized seed. Keep down weeds between drills by scarifying, and earth as high as possible.

EXPERIMENTS IN BEEF-PRODUCTION.

"INTERESTED," Pohokura, Taranaki:—

Would you kindly give me information on the following, through the *Journal*: I have read with interest the experiments the Department are carrying out with the different breeds of sheep for fat-lamb raising, and find same very instructive, and should like to see similar experiments carried out with different breeds of beef-cattle, both pure-bred and crossbred. I think it would be very valuable to the fatterer to know which

breed brings in the quickest net returns. Personally, I should like to see an experiment carried out between the pure Shorthorn and the pure Hereford and both crossed; also the Aberdeen-Angus.

The Fields and Experimental Farms Division replies,—

Some experiments in grazing and feeding various breeds of cattle may be undertaken later. It is pointed out that much greater provision will have to be made for this purpose, and that a very much longer period is required to arrive at conclusions with cattle than with sheep.

UTUWAI, OR BIDABID.

“UTUWAI,” Colyton :—

Will you please let me know if there is any way of destroying utuwai, or bidabid as it is more commonly called? I find that after the runners have made some growth from the main root they develop a tender yellow shoot, which appears to be another root, and, in my opinion, that is the reason utuwai gains such a quick hold in the ground.

The Fields and Experimental Farms Division replies,—

It is presumed that your inquiry refers to steep country, or to country which on account of the presence of logs, &c., cannot be cultivated. In such country some control can be established by means of fires, followed by grass-sowing and judicious stocking. This weed is not usually of serious importance after grass has been well established.

RING-BONE.

“SUBSCRIBER,” Mangonui :—

Is it possible to cure ring-bone in horses? The animal I wish to cure has been lame about two years, and has a hard swelling extending all round the foot, over the coronet. Only one hind foot is affected. If it is possible to improve the condition of the foot, where could I obtain the remedies required?

The Live-stock and Meat Division replies,—

Once a ring-bone has formed there is no possibility of cure. Horses sometimes have them and go sound; this is when the joint or tendons are not interfered with. You state, however, that your horse has been lame about two years. The animal is evidently unfit for work without cruelty, and your best plan is to destroy it.

FAT-HEN.

“WILLIAMSBURG,” Dunedin :—

I intend sowing an acre of land infested with fat-hen, the soil being rich. It will be subsoiled before working up. As I understand that where weeds are very prevalent it is sometimes recommended to drill the seed in, can you tell me the best course to pursue with this end in view?

The Director of the Fields and Experimental Farms Division replies,—

As the seed of the fat-hen has ripened and fallen this year, I should advise ploughing the land deeply for the purpose of thoroughly covering the seed, and so prevent germination as much as possible. In sowing I would recommend drilling the seed in. This would admit of weeding.

HORSE AILMENT; PENNYROYAL.

“SUBSCRIBER,” Churchill :—

Could you inform me through the *Journal* as to what is the cause of swellings on my horse's body? They are about as large as a man's hand, and seem very flabby.

There are three distinct swellings, and are situated behind the shoulder, and seem to shift about a bit. The horse is running with another one. But I do not think the swellings are due to a kick from the other horse, as one of them runs well under the body.

Secondly, could you enlighten me as to whether pennyroyal causes abortion in cows?

The Live-stock and Meat Division replies,—

We could not tell without examination what is the cause or nature of the "swellings." They are probably of no moment, and will disperse naturally.

No, we do not think pennyroyal causes abortion.

LUCERNE.—*ACACIA BAILEYANA*.

"A. B. H.," Matahiwi, Masterton :—

Is the Department supplying seed, manure, and inoculated soil for lucerne experimental plots? Where can the seeds of the *Acacia baileyana* be procured?

The Director of Fields and Experimental Farms Division replies,—

No decision has yet been arrived at as to whether the Department will repeat its offer of last year to supply experimenters with sufficient seed, soil, and lime to cultivate an acre of lucerne. Should it be decided to do so, due notice will be given in the *Journal*. Any reputable seedsman will supply or procure *Acacia baileyana* seed.

TEMPORARY PARALYSIS OF COW'S LEG.

MR. JAMES BISHOP, Pleasant Point :—

I have a young cow, calved about three months, milking well, and in good thriving condition; but one of her hind legs becomes paralyzed or stiffened at times, so that she cannot bend it either at the hock or the hoof, but holds it straight out behind, with the hoof dragging on the ground. This comes on suddenly and lasts a few minutes, goes off just as suddenly, and she then walks all right. Can you tell me the cause, and what treatment, if any, will be beneficial?

The Live-stock and Meat Division replies,—

This appears to be a case of luxation or partial dislocation of the patella. The patella, which corresponds to the knee-cap in man, is a bone placed in front of the stifle-joint. It is kept in its place by ligaments and certain muscles, and works in a groove between two prominences of the end of the femur. The internal prominence is the larger; and owing to accident or weakness of the muscles the patella slips out of the groove to the outside, causing the symptom stated—viz., inability to bring the leg forward. By manipulating the part the bone can be pushed back into its proper place, when the animal will walk as if nothing had happened, until the bone slips out again. When the bone goes into its proper place again there is generally a distinct "click" heard. This, while a serious accident in a horse, is not of so much consequence in a cow. Your cow, being young, may grow out of the trouble as she gets stronger. Keep her on level pasture, and apply a blister to the stifle, composed of powdered cantharides, 2 drams; lard, 2 oz. Rub this well into the parts for ten minutes. It will be necessary to keep the cow in the bail for twenty-four hours afterwards, to prevent her licking the part and blistering her mouth.

STRAWBERRIES AND RASPBERRIES.

MR. J. C. FOWLER, Peach Grove, Marton :—

I shall be obliged by replies to the following queries, through the *Journal*. My strawberries have sent out no runners, presumably because they have been in fruit continuously, and still yield a picking. I want to make a commercial bed for next season. What I wish to know is whether divisions of the crowns will answer the same end as runners. I may say the variety is a seedling raised by a friend—a superb variety.

I also want to know the most suitable manure for a raspberry plantation on very rich reclaimed peat land, where this fruit does very well. Which would be the better

superphosphate or basic slag? Cousins, in his book "The Chemistry of the Garden," advises heavy dressing of superphosphate, but probably on account of the natural acidity of the peat land another manure might be better.

The Orchards, Gardens, and Apiaries Division replies,—

Dividing the crowns for planting out is not recommended, as the plants, having been allowed to fruit continuously, will have become somewhat exhausted. In order to obtain runners the best plan will be *not* to allow the plants to fruit next season. This will enable them to produce good strong runners.

For raspberry-growing on your land I would advise a dressing of basic slag, applied at the rate of 4 cwt. or 5 cwt. per acre.

"PROUD-FLESH" ON LEG OF MARE.

MR. A. M. FEIST, Otarere, *via* Rotorua :—

I have tried bluestone for months to remove some large lumps of proud-flesh formed on the hind leg of a fine mare. She was lacerated twice in the same place by barbed wire. After bluestone is applied she keeps the wound raw by chafing with her hoof. One of the lumps is now as large as a teacup. Can you furnish me with any remedy?

The Director of the Live-stock and Meat Division replies,—

In place of bluestone, I would suggest that you should have used nitrate of silver in order to check the excessive granulations during the healing processes which constitute the so-called "proud-flesh." I fear that in the case where the granulation tissue has reached the size of a teacup such methods will not succeed in entirely removing the extra growth, and it may be necessary to resort to surgical interference. The operation would be best carried out by a duly qualified veterinary surgeon. A safe and efficient instrument for removing the superabundant tissue would probably be a firing-iron, heated to a dull red, or the surgical instrument known as an "ecraseur" could be used. Such an operation would be attended by a considerable amount of pain, necessitating the use of a local or general anæsthetic, and for this reason, if for no other, professional assistance should be sought.

CRACKED HOOF OF COW.

MR. R. SNODGRASS, Westport :—

I have a cow in milk with the outer half of each fore foot split up and grown longer than usual. She walks slightly on her heels, and used to go lame, but now appears to be only tender on her fore foot. She has been bad for about six months. Will you kindly inform me what steps to take in treating her?

The Director of Live-stock and Meat Division replies,—

Your cow is evidently suffering from cracked hoof. The best remedy, if the crack does not extend up into the region of the hair, is to fire across the top of it with a firing-iron or some such instrument having a blunt edge—an old file or blunt axe-edge would do. The iron should be heated to a dull-red heat, and a horizontal line drawn across immediately above the limit of the crack, about $\frac{1}{2}$ in. deep. Should the crack extend into the hair, V-shaped lines should be fired on either side of it, the V extending from the top of the hoof to about the middle of the crack. The object of these lines is to limit the extension of the crack. The overgrown hoof should be trimmed down by means of a farmer's knife or hoof-cutter, and great care should be taken to keep the crack cleaned out and free from dirt or grit. Neglect of this precaution frequently gives rise to inflammation of the sensitive structures enclosed within the hoof, followed by acute lameness and further complications.

PIG-FEED.

MR. J. A. CRUICKSHANK, East Chatton, Gore :—

I would be very pleased to know, through the *Journal of Agriculture*, if there is any food at the farmers' command that would take the place of skim-milk or whey for

feeding young pigs. I do not milk for the factory, and consequently have very little milk to spare.

The Live-stock and Meat Division replies,—

If by "food at the farmers' command" you mean grown upon the farm, you are referred to the Department's *Journal* for April last, page 450. There are quite a number of artificial foods on the market especially suitable for pig-feed.

FIRE-BRANDING OF SHEEP.

"SUBSCRIBER," Hokianga :—

Being a novice, I would like your advice, through the *Journal*, how to fire-brand sheep. Is the nose the best place? Would you advise me to get the Methven brand?

The Live-stock and Meat Division replies,—

The centre of the nose is the best place to fire-brand sheep, as in that position the brand is most easily seen. There are a number of good fire-marking appliances on the market which are well spoken of, including the Methven; but this is a matter which is best left to the discretion of the user.

In this issue of the *Journal* the Department of Immigration has an announcement of interest to those desirous of securing the services of domestic workers assisted to New Zealand by the Government.

The number of visitors registered at the main experimental farms during the past month was as follows: Ruakura, 527; Weraroa, 135; Moumahaki, 130; Waerenga, 48.

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of May :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
MOTUIHI ISLAND (AUCKLAND).					
1	Fox-terrier ..	Male ..	Liverpool..	J. P. Sydney ..	16 Arawa Street, Auckland.
SOMES ISLAND (WELLINGTON).					
1	Pug-dog ..	Female ..	London ..	Mrs. Dean ..	Whangamona.
QUAIL ISLAND (LYTTELTON).					
2	Fox-terriers..	Male ..	London ..	W. H. Calvert ..	C/o N.Z. Express Co., Lyttelton.
1	Airedale terrier	" ..	" ..	G. Kingscote ..	Ditto.
1	Bull-terrier ..	" ..	" ..	" ..	"
1	" ..	Female ..	" ..	" ..	"
1	Guernsey calf	Bull ..	Melbourne	H. S. Kyle ..	Sockburn.

THE DOMINION'S EXPORTS TO BRITAIN.

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.	Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri- gum, Cases.	Sundry.
January, 1913	166,714	229,179	6,886	109,251	63,864	118,986	..	329	..	6,969	2,215	4,110	611 carcasses pork.
" 1912	237,284	302,339	12,424	114,512	64,005	95,394	..	..	7,295	6,365	1,942	3,407	59
February, 1913	326,337	403,698	12,666	89,098	81,733	127,968	..	..	..	12,520	4,295	7,973	64 carcasses pork.
" 1912	208,424	273,246	13,052	101,544	62,398	106,074	607	..	..	6,831	1,615	1,056	..
March, 1913	86,224	210,166	7,428	47,560	59,844	49,661	..	115	..	12,552	7,662	4,043	250 carcasses pork.
" 1912	324,192	518,402	20,201	64,925	49,308	70,022	..	4,980	..	3,832	1,352	2,644	16
April, 1913	303,937	647,948	16,834	11,358	52,934	61,988	..	300	..	9,049	3,351	3,889	457 carcasses pork.
" 1912	213,178	355,829	7,046	38,986	38,137	31,615	4,905	2,180	..	5,134	1,958	4,458	..
May, 1913	418,221	731,520	22,073	637	46,304	33,231	..	265	2,000	15,751	5,005	9,057	100 carcasses pork.
" 1912	454,506	744,287	32,691	1,441	40,535	51,833	11,157	26,569	1,500	11,963	2,326	6,287	..
June, 1912	170,738	287,697	24,605	558	7,712	18,138	9,160	7,622	2,039	5,646	1,168	1,213	221 carcasses pork.
" 1911	214,079	448,432	15,789	..	6,323	19,568	39,422	..	14,128	4,763	525	5,528	2,434
July, 1912	291,097	371,474	29,457	684	1,255	16,567	44,324	23,215	20,573	7,463	1,856	5,892	210 carcasses pork.
" 1911	206,869	260,761	14,296	..	276	14,100	29,452	..	10,334	6,022	1,073	2,786	175
August, 1912	207,239	157,589	10,478	559	..	10,409	42,580	38,802	19,562	3,768	523	4,219	203 carcasses pork.
" 1911	66,608	110,054	3,653	..	..	5,260	31,976	..	18,231	3,443	303	3,475	..
September, 1912	44,657	40,759	1,174	8,723	1,204	6,671	15,742	17,363	19,933	2,957	501	3,671	220 carcasses pork.
" 1911	102,081	40,057	6,059	6,404	..	7,390	38,151	..	33,059	5,604	393	7,672	..
October, 1912	51,263	15,393	3,882	49,962	16,389	4,647	7,952	64,480	5,396	4,193	401	9,075	..
" 1911	9,417	2,043	100	49,626	11,501	2,182	..	..	32,094	4,514	754	2,982	..
November, 1912	54,175	8,286	282	140,751	57,181	33,305	3,680	40,896	13,892	9,866	1,911	5,466	..
" 1911	47,770	10,427	403	135,741	57,319	44,334	15,833	..	16,606	7,844	2,183	3,085	..
December, 1912	117,740	106,310	4,774	119,885	66,213	44,789	5,868	30,490	10,070	3,816	2,613	3,686	..
" 1911	72,122	91,965	765	109,397	46,883	54,297	..	..	4,366	5,719	1,364	2,703	..

LONDON MARKET VALUES.

COMPARATIVE STATEMENT COMPILED FROM THE HIGH COMMISSIONER'S CABLES FOR THE THREE MONTHS ENDED 31ST MAY, 1913.

London Date.	Mutton.		Lamb.		Beef.		Butter.				Cheese.		Hemp (Spot).			Hemp (Forward Shipment).			Wheat.		Oats.			
	Canterbury.	North Island.	Canterbury.	Other than Canterbury.	Hinds.	Fores.	New Zealand.	Danish.	Siberian.	Australian.	Argentine.	New Zealand White.	New Zealand Coloured.	Canadian.	New Zealand Good-fair.	New Zealand Fair.	Manila.	New Zealand Good-fair.	New Zealand Fair.	Manila.	Short-berried.	Long-berried.	Sparrowbills.	Danish.
1913.																								
Mar. 1	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 117/0 119/0	133/0	110/0	111/0	110/0	060/6	060/6	..	33/0/0	31/0/0	33/10/0	33/0/0	31/0/0	33/10/0	37/6	38/6	24/6	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 117/0 120/0	133/0	110/0	110/0	109/0	061/6	061/6	..	34/0/0	31/0/0	34/0/0	34/10/0	31/0/0	35/0/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 119/0 121/0	133/0	110/0	110/0	109/0	061/6	061/6	..	34/0/0	31/0/0	33/0/0	34/10/0	31/0/0	34/10/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 119/0 121/0	130/0	109/0	109/0	109/0	061/6	061/6	..	34/0/0	31/0/0	33/0/0	34/10/0	31/0/0	34/10/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 119/0 120/0	129/0	111/0	109/0	109/0	061/6	061/6	..	34/0/0	31/0/0	33/0/0	34/10/0	31/0/0	34/10/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 3 ¹ / ₂	d. 3 ¹ / ₂	d. 115/0 117/0	125/0	110/0	108/0	108/0	060/6	..	64/6	34/0/0	31/0/0	33/0/0	34/10/0	31/0/0	34/0/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 115/0 117/0	120/0	110/0	108/0	108/0	060/6	059/6	065/0	33/0/0	30/0/0	33/0/0	33/0/0	30/0/0	33/0/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	119/0	108/0	109/0	108/0	058/0	..	..	33/0/0	30/0/0	33/0/0	32/0/0	29/10/0	33/10/0	..	..	23/0	21/0
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	120/0	106/0	109/0	106/0	058/6	..	..	32/0/0	28/10/0	33/0/0	32/0/0	28/10/0	34/0/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	117/0	104/0	107/0	103/0	058/6	057/6	..	31/0/0	28/0/0	33/0/0	31/0/0	28/0/0	34/0/0	..	..	..	..
May 3	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	114/0	100/0	107/0	104/0	058/0	056/6	..	31/0/0	28/0/0	33/10/0	31/0/0	28/0/0	34/0/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	114/0	100/0	106/0	104/0	059/6	056/6	..	31/0/0	28/10/0	33/0/0	32/0/0	28/10/0	33/10/0	..	..	39/0	22/6
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 113/0 115/0	114/0	100/0	106/0	104/0	059/6	057/6	..	31/10/0	28/0/0	32/0/0	32/0/0	28/0/0	32/10/0	..	..	..	..
"	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 6 ¹ / ₂	d. 6 ¹ / ₂	d. 4 ¹ / ₂	d. 4 ¹ / ₂	d. 115/0 115/0	115/0	100/0	106/0	102/0	061/6	059/0	..	30/0/0	26/10/0	32/0/0	30/0/0	26/10/0	31/0/0	..	..	..	..

HEMP AND TOW GRADING RETURNS.

MAY.

Hemp.—The total number of bales graded was 17,107, as compared with 9,931 for the corresponding month of last year, an increase of 7,176 bales. For the twelve months ending 31st May, 1913, the number of bales graded was 137,169, as compared with 90,529 for the previous twelve months, the increase being 46,640 bales.

Tow.—During the month 5,128 bales were dealt with, as compared with 2,814 for the corresponding month of last year, an increase of 2,314 bales. For the twelve months ending 31st May, 1913, the number of bales graded was 47,003, as compared with 24,855 for the previous twelve months, the increase being 22,148 bales.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF MAY, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	666	2,212	903	114	27	3,922
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	..	1,569	3,865	220	..	..	5,654
Wellington ..	..	..	1,913	2,454	236	67	12	4,682
Blenheim ..	..	71	208	..	..	..	..	279
Picton ..	..	175	105	125	13	..	..	418
Lyttelton ..	..	52	..	..	..	..	..	52
Dunedin ..	..	21	194	502	261	..	..	978
Bluff ..	..	..	125	821	156	20	..	1,122
Totals ..	..	319	4,780	9,979	1,789	201	39	17,107
Percentages of totals	..	1.87	27.94	58.33	10.46	1.17	0.23	..

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	26	377	744	281	1,428
Napier ..	..	..	..	..	..
Foxton ..	214	603	379	..	1,196
Wellington ..	178	1,026	207	56	1,467
Blenheim ..	38	..	..	..	38
Picton ..	167	29	13	..	209
Lyttelton ..	13	76	..	..	89
Dunedin ..	..	80	70	35	185
Bluff ..	..	92	339	85	516
Totals ..	636	2,283	1,752	457	5,128

Stripper-slips.—Passed for export: Auckland, 23; Foxton, 248; Wellington, 433; Picton, 44; Lyttelton, 12; Dunedin, 37; Bluff, 8—total, 805. Condemned: Auckland, 3; Wellington, 30; Dunedin, 7; Bluff, 10—total, 50.

NEW ZEALAND - SAN FRANCISCO TRADE.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti, and transshipments for Vancouver from New Zealand, since January last:—

	"Tahiti," 31st Jan.	"Moana," 28th Feb.	"Aorangi," 28th March.	"Tahiti," 25th April.	"Moana," 23rd May.
Gum, packages	20	20	50	..	30
Seeds, sacks	..	..	31	61	..
Grain, &c., sacks	69	924	57	115	84
Meats, cases	272	100	262	250	355
Onions, cases	52	1,759	10	8	19
Potatoes, sacks	24	2	32	10	27
Sundries, packages	126	54	131	235	210
Butter, boxes	7,782	7,281	3,788	405	8
Hemp, bales	296	282	..	271	394
Frozen lamb, carcasses	3	2	3	2	2
" veal, ...	71	..	..	..	..
" beef, quarters	489	150	..	..	..
" sundries, packages	..	2	..	13	..
Timber, pieces	1,440	..	93	..	..

NEW ZEALAND - VANCOUVER TRADE.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since December last:—

	"Marama," 20th Dec.	"Makura," 17th Jan.	"Zealandia," 14th Feb.	"Marama," 14th March.	"Makura," 12th April.	"Niagara," 10th May.
Butter, boxes	11,377	10,960	5,205	9,402	6,535	465
Mutton, carcasses	..	..	..	..	..	1,291
Beef, quarters	580	716	..	1,254	2,428	5,492
Veal, carcasses	393	276	181	400	402	324
Frozen sundries, packages	12	..	39	147	86	79
Wool, bales	20	30	..	..	..	50
Grass-seeds, beans, &c., sacks	..	..	54	..	147	..
Hides and skins, sacks, &c.	595	329	583	..	249	270
Onions, cases	..	14	1,572	..	732	25
Sheep-skins, bales	..	24	112	..	24	..
Jam, cases	50	50	75	175	25	91
Sundries, packages	92	313	250	214	470	112
Potatoes, crates	165	20	..	..	..	..
Kauri-gum, packages	21	..	176	41	7	150
Hemp, bales	..	246	129	126	..	126

STOCK EXPORTED.

MAY.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.			Sheep.			Swine.
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To South America.	To Australia.	To Pacific Islands.	To Argentine.	To Pacific Islands.
Auckland	4	4	..	..	89	..	..	254	..	56
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	..	..	..	..	..
Wellington	1	..	..	2	..	..	20	..	..	..
Lyttelton	1	..	..	1	..	..	..	..	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	35	..	..	2	..	..	..	..	..	..
Bluff	20	..	..	..	..	..	71	..	..	..
Totals	61	4	..	5	89	..	91	254	..	56

The following are the particulars of the horses shipped: Thoroughbred—3 geldings, 1 mare; draught—3 stallions, 13 colts, 30 mares, 9 geldings; hackney—5 mares; trotting—1 gelding; pony—1 Shetland mare.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of May, 1913, of agricultural and farm products :—

Item.	Quantity.	Value.
Bran	..	£
Butter	..	..
Cheese	1 cwt.	5
Obaff	4 tons	16
Fruits, fresh, all kinds	1,537,589 lb.	7,895
Barley	..	..
Oats	..	..
Wheat	..	..
Onions	2,679 cwt.	1,032
Pollard and sharps	383 tons	1,785
Potatoes	1 ton	4
Seeds, grass and clover	1,067 cwt.	1,013
Total value imported	..	£11,705

AGRICULTURAL EXPORTS.

THE YEAR'S FIGURES.

THE following figures show the values of the exports of the principal agricultural products for the years ended 31st March, 1912 and 1913:—

Products.	1912.	1913.	Increase.
	£	£	£
Butter	1,776,440	2,056,615	280,175
Cheese	1,297,088	1,859,179	562,091
Beef, frozen	250,304	324,578	74,274
Mutton, „	1,197,594	1,544,250	346,656
Lamb, „	1,750,236	1,825,342	75,106
Grain, wheat and oats	235,125	564,294	329,169
„ and pulse other than wheat and oats ..	101,861	162,872	61,011
Potatoes	6,439	150,601	144,162
Hemp	310,884	483,353	172,469
Tow	23,289	41,005	17,716
Hops	11,594	20,698	9,104
Hides	159,835	234,735	74,900
Skins (all kinds)	676,407	860,782	184,375
Tallow	566,373	672,849	106,476
Wool	6,579,074	8,065,945	1,486,871
	14,942,543	18,867,098	..
Total increase	..	..	3,924,555

CO-OPERATIVE EXPERIMENTS.

THE Department co-operates with farmers who desire to carry out crop experiments—both variety and manurial—on their farms.

The Department will supply the seed and manure, and will design and supervise the experiments; while the farmer provides the land and labour, and retains the crop.

Further information can be obtained from—

THE DIRECTOR OF FIELDS AND EXPERIMENTAL FARMS,
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